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CONTENTS FOR NOVEMBER 1933

VOL. 39

NO. 11

THE COVER

"King for a Day"

Photograph by C. B. MUNN

WHY THE PLAINS ARE TREELESS

By DAREL McCONKEY..... 483

THE RESTORATION OF RURAL LIFE

By HENRY A. WALLACE..... 486

OREGON'S FOREST FIRE TRAGEDY

By LYNN F. CRONEMILLER..... 487

MONARCH OF THE PRAIRIES

By E. R. YARHAM..... 491

THE GREAT LIGNIN MYSTERY

By LOUIS ELSBERG WISE..... 494

EDITORIAL

The Forestry Corps on Review..... 497

"SACRED" DEER

By FRANK A. WAUGH..... 498

WHEN EAST GOES WEST

By NELSON C. BROWN..... 500

ITS ANCIENT ENEMY DISCOVERED

By ELIZABETH E. MORSE..... 502

A FOREST PAGE FOR BOYS AND GIRLS

Don and Donna—A True Story of California Valley Quail
By ELLEN TORELLE NAGLER..... 504

THE CIVILIAN CONSERVATION CORPS CARRIES ON!

By FREEMAN C. BISHOP..... 507

BIG TREE (Tree Series)

..... 510

AROUND THE STATES

..... 512

BOOK REVIEWS

..... 517

NUT TREE COOPERATORS URGE EXTENSION OF PROGRAM

..... 518

ASK THE FORESTER

..... 519

SOURCE OF DUTCH ELM DISEASE FOUND

..... 520

THE FOREST FIRE

Poem by MARY GREENE WHIPPLE..... 523

"WHO'S WHO" AMONG OUR AUTHORS

..... 528

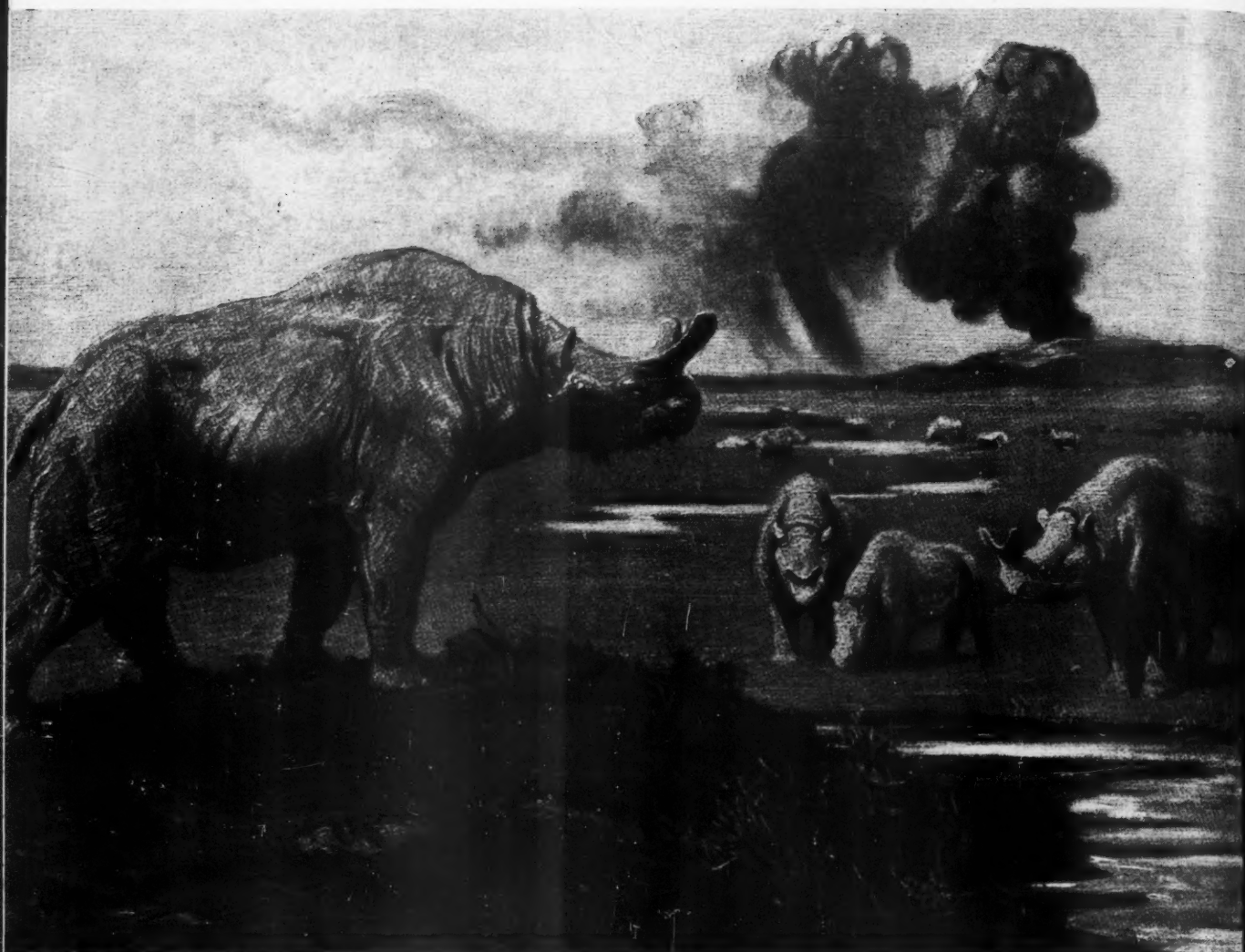
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OLIGOCENE TIME MARKED THE BEGINNING OF THE RISE OF THE ROCKY MOUNTAINS. AS THE BACK-BONE OF THIS GREAT RANGE REACHED HIGHER INTO THE REALM OF THE CLOUDS, MOISTURE-BEARING WINDS FROM THE PACIFIC OCEAN WERE CUT OFF FROM THE PLAINS. TREES WHICH HAD EXISTED THOUSANDS OF MILENNIA IN THIS VAST INLAND GREENHOUSE COULD NOT SURVIVE THE CURTAILED RAINFALL AND LACK OF MOISTURE, AND ONLY THE TINY GRASSES REMAINED TO POSSESS THE BROAD ACRES STRETCHING AWAY TO THE HORIZON. "SO THEY MARCHED OUT FROM THE PHALANX OF THE TREES, THESE DWARFS IN FLORAL COMBAT, GREEN SPEARS TRIUMPHANTLY LIFTED, AND CLAIMED THE MAMMOTH MEADOWS THEY HAVE EVER SINCE HELD AS THEIR OWN." AND THUS WAS BEGUN THE WRITING OF A STRANGE AND INTERESTING CHAPTER IN THE INFLUENCE OF THE PLAINS ON AMERICAN ANIMAL PREHISTORY, FOR ON THE BOUNTY OF THE PLAINS LIVED MANY GRAZING CREATURES OF OLIGOCENE TIME SUCH AS THIS HERD OF BRONTOTHERIUM PLATYCERAS - - THE FLAT-HORNED BRONTOTHERES, PHOTOGRAPHED HERE AFTER RESTORATIONS BY ERWIN CHRISTMAN AND CHARLES R. KNIGHT.

AMERICAN FORESTS

Vol. 39

NOVEMBER, 1933

No. 11

WHY THE PLAINS ARE TREELESS

Geology Scans Prehistory to Explain Why Prairies Grow No Trees, Discovers an American Mediterranean, and a Range of Mountains Called Rocky

By DAREL MCCONKEY

THE little red history book contemporaneous with the little red school house among the hills of a middle Atlantic state began the story of America with an Italian gentleman named Columbus. The pre-adolescent pupil who pored its pages was given to understand, by inference, that nothing happened in this country before Columbus "discovered" it.

No mention was made of a Norse adventurer named Leif, son of Eric, who "discovered" America about the year 1000. Nor was any mind paid to a nameless nomadic Mongol several thousand years previous who found hunting bad in northeast Asia, and, wandering up the pitcher's spout of the eastern Asiatic coast, popped out the Bering nozzle and "discovered" America first of all; his descendants were named "Indians." Neither did the little red history book, nor its less elementary successors, tell why there are such geographic features as the Rocky Mountains, and the Great Plains, and why so few trees grow on the latter. All this despite that "history" is defined as "a systematic written account of events affecting a nation."

Questioned about the treelessness of North American prairies, the historical geologist might, in order to clarify his answer, begin thusly: "If our calendar really began with the Year One, or about two billions of years ago, when the earth was new, I should say that in the year 1,766,500,000, or thereabouts, the Gulf of Mexico extended inland over Texas, and covered part of what is now Colorado and Kansas."

That, he would add, was the Cretaceous period in earth's history. It was an important chapter, as written in the stony pages of Erda's life-story. It marked the beginnings

of flowering plants, and the decline and gradual disappearance of that great race of reptilian creatures, the dinosaurs. A strip of the present Pacific Coast was also submerged, and neither the Rocky Mountains nor the Pacific Coast ranges had been elevated. The country was a land of low relief, heavily wooded, dotted with swamps. The climate was warm and constant, there was abundant rainfall, and frost was unknown.

The slow submergence of parts of the North American continent took so long that there was time, in the interval, for flowering plants to originate in the Arctic regions—as nearly as can be determined—then above water, and spread southward over American and Eurasian lands.

Then, the boreal area was gradually submerged, more and more of the Atlantic and Pacific borders slipped under the sea, and the Gulf of Mexico gradually broadened its watery domain as it followed up the Mississippi Valley, finally to unite in the north with

Arctic waters which had, in the passage of incalculable time, crept up the Mackenzie River Valley. Gulf states and those of the southeastern seaboard were under water, and Florida was an island. In that equable climate palms and figs grew far north of the Canadian line, and in our own country grew camphor-trees, alligator pears, and fig-trees side by side with oaks, walnuts, magnolias, sassafras, persimmon, and other present-day natives. Pterodactyls, or flying-lizards, with a wingspread twice that of a condor, flapped grotesquely above the monotonous landscape. Fierce, predatory fishes, relatives of the shark, barracuda, and tarpon, swam in the warm inland sea. There were swimming lizards, and the great extinct Archelon turtle, weighing two tons.

FEW TRAVELERS CROSS THE GREAT PLAINS WITHOUT ASKING "WHY ARE THE PRAIRIES TREELESS?" SCORES OF HYPOTHESES HAVE BEEN ADVANCED, SOME LAYING IT TO OVER-GRAZING BY BUFFALO, OTHERS TO FIRE. BUT MR. MCCONKEY, PROBING INTO PREHISTORY, THE ZOOLOGICAL AND THE PHYSICAL, PRESENTS IN THIS ARTICLE CONDITIONS THAT EONS AGO DROVE FORESTS FROM THE PRAIRIES AND HAVE SINCE KEPT THEM LARGELY TREELESS.

BUT WILL THE GREAT PLAINS REMAIN TREELESS? CAN FORESTERS MAKE TREES GROW WHERE NATURE FOR MILLIONS OF YEARS HAS FAILED? IN THE DECEMBER ISSUE CLYDE M. BRUNDY WILL REVIEW THE RESULTS OF YEARS OF EXPERIMENTING WITH GROWING TREES ON THE PRAIRIES AND WILL PICTURE WHAT CAN BE DONE BY ARTIFICIAL FORESTATION.—EDITOR

Toward the close of Upper Cretaceous time the continental seas withdrew as terrestrial forces lifted the land once more above the tide. The present Rocky Mountain region became one of delta and coastal swamps. As the forces of erosion by degrees wore down the western land, sedimentary deposits extended the inland coast slowly eastward, until the present plains region became a land of swamps and bogs.

At the dawn of the Tertiary Period interior North America was land once more, but the Gulf was still a much enlarged picture of that found on present-day maps, and Florida had become a submerged land—an American Atlantis that rose again from its watery grave. The climate was still equable, and a warm climate strand-flora grew along the enlarged gulf coast. It included Nipa palms and breadfruit, no longer existent in the Western Hemisphere. There were coral-reefs in Georgia, and a temperate forest covered Alaska and Greenland. There was free interchange of animal and vegetal life between the three northern continents, by means of connecting lands.

The Eocene Epoch produced a new zoological scene. The giant reptiles, except for scattered remnants, were gone, and the mammals had come to reign in their stead. The great saurians had failed, and Nature, in a new whimsy, had cut her animals from a smaller pattern; only one or two of the Eocene mammals was larger than a sheep. From no one knows where came little *Eohippus*, sire of all subsequent horses, to browse in American forests. He was no larger than a fox, and had four toes on his front feet and three on the rear. *Diacoclexis*, an odd little creature the size of a rabbit, was to beget the cud-chewing race of animals. And the father of camels, native to North American soil, was hardly as large as a domestic cat. Lemurs and monkeys, in Eocene time, made their only appearance on the North American continent.

The vegetation was modern in character, nearly all the common forest trees being represented by species quite similar to those of today. Grasses existed, but did not cover the open places. The hoofed mammals were all browsing creatures, and no true grazers had yet evolved.

Eons passed as these changes occurred. Ephemeral humans who rarely count the seasons, in actual experience past the Biblical allotment, cannot conceive the millions of years that elapsed. But let us be reminded of time past

all comprehension as these glibly-told events are related.

In Oligocene time began the cyclic rise of the Rocky Mountains. From new-built heights washed down a greater volume of sediments, and the great Median Valley of America had its swamps and deltas gradually filled. That was the beginning of the Great Plains. As the backbone of the mountains reached more and more into the realms of the clouds, moisture-bearing winds from the Pacific Ocean were cut off. Pampered trees, existing for thousands of millennia in a vast inland greenhouse, found the rainfall curtailed until they could no longer survive.

But the tiny grasses, fighting valiantly for a scanty place in the sun through ages of forest predominance, were more fitted to possess the broad horizontal acres stretching away to the horizon. So they marched out from the phalanx of the trees, these dwarfs in floral combat, green spears triumphantly lifted, and claimed the mammoth meadows they have ever since held as their own.

The grassy plains offered a new larder for Tertiary animals. Until the grasses had captured the plains mammalian eaters of green

products must needs depend on tree-leaves and forest vegetation. But remains of Oligocene and subsequent animals show a gradual adaptation of jaws and teeth to feed on the grasses, necks to reach the ground, and eyes to watch for danger while the head was lowered. Commonest of all the early eaters of grass were the grazing-hogs, so called because of porcine resemblance, though many of them had catlike tails and claws on their feet. Horses were now the size of sheep, and had three toes, fore and aft.

Upper Oligocene found peccaries and giant pigs in great abundance living on the bounty of the plains. The grass-eaters had evolved to feed on the herbage, and close on their heels had come the development of the carnivores to feed on the ruminants. Oligocene time was marked by the presence of more dogs, and more kinds of dogs, than have existed on earth before or since, though none was larger than a timber wolf. The open plains, though advantageous to grazing animals from the standpoint of food, offered little or none of the protection afforded individuals by broken terrain or the labyrinths of the forest. To ward off the danger of wild dogs and the developing predatory felines, the grass-eaters hit upon the defense strategy of banding together for mutual protection; it was thus that the herding instinct in all probability evolved. It is re-

GEOLOGIC CALENDAR

		Present Epoch	Age of Man.
CENOZOIC ERA (60,000,000 years)	Quaternary Period (2,000,000 years)	Pleistocene Epoch	Ice Age. Man's ancestors.
		Pliocene Epoch	Land-masses similar to those of today.
	Tertiary Period (58,000,000 years)	Miocene Epoch	Height of hardwood development. Further elevation of Rockies.
		Oligocene Epoch	Elevation of Rocky Mountains. Development of Great Plains. Early grazing animals and carnivores.
		Eocene Epoch	Modern vegetation. Beginnings of Plains. Browsing mammals.
MESOZOIC ERA (117,000,000 years)	Cretaceous Period (61,000,000 years)	Inland sea, dividing North America. Land-relief low, heavily wooded. Decline of dinosaurs.	
	Jurassic		
	Triassic		

markedly preserved in such animals as the peccaries, which still inhabit the plains of Texas. Against this defensive strategy on the part of the now gregarious grass-eaters, it is supposed that the militant counter-strategy of carnivorous pack-hunting evolved.

Only a slight indication can be given here as to the influence of the plains on American animal prehistory. The horse evolved here, spread over the entire country in dozens of different forms, then unaccountably became extinct in late Pleistocene time, to be reintroduced to the arena of his ancestral development by Spanish adventurers, to play a remarkably important role in the Caucasian occupation of the West. The camel, whose birthplace was America, reached Asia in Pliocene time, and from there, in the time of man, became the Oriental and African "ship of the desert," to return to his homeland only as a zoological oddity. The tapir, also indigenous to North America, chose eventually to settle on the continent to the south. Of other monstrous animal developments, such as the sabre-tooth tigers and hairy mammoths, known perhaps to early Indians, and dozens of other interesting specimens, no space for mention can here be found. But the grasses, the grazers, and the carnivores had set the stage for the nomad social life of America's first men, the Indians, whose transient scheme of existence was fashioned to fit the movements of the herds they followed.

The Oligocene Epoch brought the plains into being. Without following the extended cycles of elevation by the Rocky Mountains—and there is evidence to show they are still "growing"—or pursuing further forestal or zoological history, let us examine, briefly and concisely, some additional "wherefores" of America's forestless plains.

Was it entirely a matter of precipitation? Was it enough that the Rocky Mountains should rise in the west and deprive Oligocene, Miocene, and subsequent middle western trees of their accustomed rainfall?

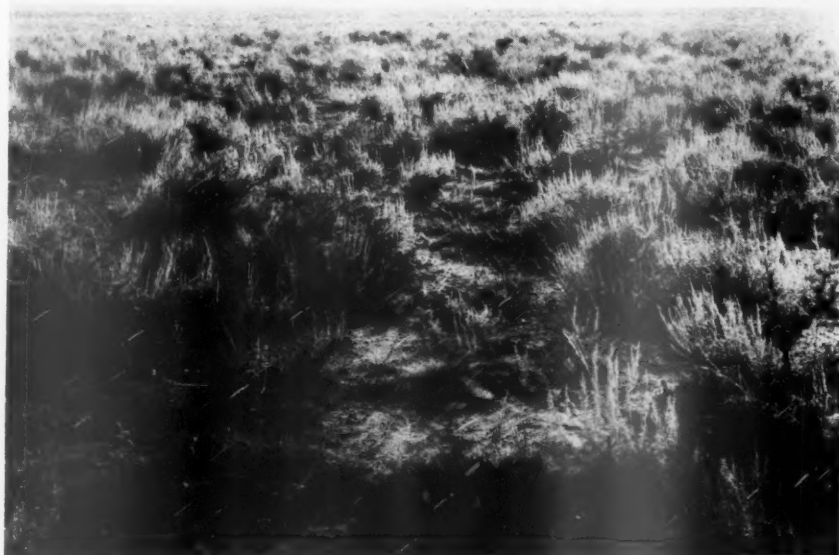
Considering the American topography of today, let us inquire into geographical and meteorological phenomena of contemporary times which indicate reasons for default of prairie trees in favor of grasses.

Prevailing winds in the United States are westerlies;

there are hundreds of local exceptions, but the greater movement of air-masses is from west to east. Winds originating over the Pacific and sweeping inland are warm and heavy with moisture. Land-levels are higher than sea-level, and the air must rise. Elevation causes cooling. Cooling causes condensation of moisture. That is why the western slopes of the Cascade and Sierra Ranges are well watered; the Puget Sound area of Washington receives more rainfall than any other spot in the United States.

Pouring down the eastern slope of the Coastal Ranges, the winds are dry and cool. But, losing altitude, they become warm again. They have had their moisture squeezed out, like a sponge, and, the ability to hold water becoming greater as the air becomes warmer—your weather man calls it "relative humidity"—the winds range across the land, seeking, as it were, to quench their thirst. They absorb such water as they can find, leaving parched deserts in their wake—in most of Nevada, Arizona, and New Mexico, and part of western Colorado.

The western bulwarks of the Rockies, again, are moderately well watered. The winds, bearing the moisture collected in their desert crossing, are cooled as they climb the westward slopes of the Rockies. Their relative humidity, or capacity for holding moisture, is lowered as they gain higher



The grassy plains offered a new larder for mammalian eaters of green products which had heretofore depended on tree leaves and forest vegetation. Remains of Oligocene and subsequent animals show a gradual adaptation of jaws and teeth to feed on the grasses, necks to reach the ground, and eyes to watch for danger while the head was lowered. Commonest of all the early grass-eaters were the grazing hogs.

altitudes and as they blow against the always-frigid ramparts of the Rockies. Again the air gives up its moisture-content, in rain or snow.

Pouring down the eastern slope of the Rockies, again a gaseous sponge squeezed dry, the winds become warmer and warmer as they toboggan to the plains, and their ability to hold water becomes greater. Here then, is a vast area exposed to the sweep of avidly warm, dry winds. No elevation exists to "squeeze out" the collected moisture. There is a clean sweep for the famed furnace-winds of the Middle West. A still warmer spot on the surface may cause an eddy in the racing wind, and begin a cyclone, for which the prairie regions are famous. But the moisture-collecting winds need not consider giving up a great deal of their vapor until the rising highlands east of the Mississippi River again force them to an elevation which automatically forces a release of rain.

(Continuing on page 526)

THE RESTORATION OF RURAL LIFE

By HENRY A. WALLACE

Secretary of Agriculture

SMALL wood-working plants scattered through rural communities exert a great stabilizing influence upon community welfare. Many of these industries have been in existence—some of them in the same families—for generations. They manufacture a great variety of articles—lumber, boxes, furniture, toys, woodenware, and novelties of many kinds. They employ a large amount of labor per unit of product. They use timber from the farm woodlands as well as from the commercial forests. They utilize the timber more closely than sawmills thereby yielding larger returns to the timber owner. The operation enables farmers to employ themselves and their teams getting out the timber or to secure work for wages at the plants. The values in the finished products are mostly in labor. The money received for them is therefore mostly net cash income to the community, which has a stimulating effect upon its buying power.

There can be no doubt that these small woods industries have furnished an incentive to many a landowner to keep his woodlands in a productive condition. The sawmills and paper pulp operations also are employers of large numbers of men. Their winter logging camps have traditionally furnished employment between seasons to the men from the farms. The stabilizing influence of all these industries rests upon a sustained yield of the raw materials by the forests. Destroy these forests and the pinch would be felt not only by those who lost their jobs with these industries but it would extend to every farm and hamlet throughout the region.

The recreation business is another source of supplemental employment and income. The White Mountains of New Hampshire, for instance, have long been justly famous in outdoor recreation. Without the forests the tourist and recreational business would vanish and with it a very important part of the farmer's markets and incomes.

The service of the forests to agriculture is not confined to supplying supplementary employment to farmers and local markets for farm crops. Forests and their industries help to share the tax burden, they protect farm lands against damage from erosion, and in some regions as in the arid west their influence upon air currents and waterflow is a distinct benefit to agriculture. The perpetuation of forests therefore is of particularly vital concern to the agricultural industry.

The economic and social problems which have appeared with the advance of forest depletion and farm land abandonment now reveal very clearly that agriculture and forestry are companion industries and that in any given region agriculture inevitably reacts to the treatment accorded the forests.

The instability of the lumber industry in its migratory progress from one forest region to another has been responsible in a large measure for farm abandonment. Invariably the localities where tax delinquency and farm abandonment

are most prevalent are the regions where intensive lumbering has exhausted the forests and then moved on. Many thousands of farms that supported families without difficulty while the industry provided a ready local market for the produce, immediately became submarginal for farming when the market passed away. As abandonment progressed the effect became cumulative. The abandonment of each farm means not only the loss of another tax-paying family in the community, but it also means more congestion and unemployment in the more prosperous communities to which they migrate. The effect of the upset economic balance therefore penetrates far beyond the region of its origin. Its influence burdens the economic and social structure of the entire country. It is a national problem and one for which the welfare of the nation demands immediate remedial action.

Much is heard nowadays about agricultural overproduction and the need of getting submarginal land out of agricultural use. It has been suggested that the rural inhabitants of the marginal regions should migrate to better agricultural land elsewhere or to industrial centers, where they can engage in other kinds of work. The proposal does not satisfy every angle of the problem. The produce from the marginal farms is mostly consumed at home and does not materially affect agricultural production, so far as the general agricultural market is concerned. If they are moved to more productive land, the result will be increased production. If they join the ranks of the laboring classes in the metropolitan areas their purchasing power will not materially increase consumption. Instead of getting the people of such regions to seek employment elsewhere it would be much better to bring employment to them.

The restoration of American (Continuing on page 527)



Henry A. Wallace



Photograph by J. H. Clark.

August 25—3 P. M., looking northwesterly into the southern edge of the fire, this photograph was taken at an elevation of 9,000 feet and about thirty miles away from the fire. Over a fifteen mile front a solid wall of flame had leaped through the tops of the trees. Upward in great white clouds the smoke billowed, leveling off into a mushroom shape at 9,000 feet. Then through this belched great clouds of smoke, churning to a height of 40,000 feet.

OREGON'S FOREST FIRE TRAGEDY

\$200,000,000 Loss as Flames Destroy Finest Stand of Virgin Timber Remaining in State

By LYNN F. CRONEMILLER

State Forester of Oregon

A BRISK north-east wind whipped through the Gales Creek Canyon, in northwestern Oregon, on the morning of August 14. By noon the humidity was so low and the fire hazard so great that loggers closed their operations. That is, all but one, who decided to haul in just one more log before closing for the day. The rigging slinger set the choker on a large Douglas fir, waved his signal, and the log started crashing its way to the landing. A cedar windfall lay directly in its path. As the giant log ground its way across the cedar a tiny wisp of smoke curled into the air. Suddenly

The great Tillamook conflagration, starting August 14, was the most destructive forest fire Oregon has experienced in sixty-five years. Originating on privately-owned timberlands and sweeping through the finest virgin forest in Oregon, it consumed in eleven days more than 10,000,000 board feet of timber, chiefly Douglas fir, valued at \$200,000,000. It burned over more than 300,000 acres. It claimed one life, a young C. C. C. worker from Illinois; a score received serious injuries. Three thousand men battled to hold back the fire, which sprinkled the cities of the Pacific Northwest with ashes and charred needles.

the fire call rang through the woods. The entire crew seized tools and rushed to the scene. Frantically they tried to control the flames but a freakish wind caught up the burning brands and carried them into the adjoining slash. The fire spread with explo-

sive force. A dense smoke column billowed out of the canyon. Hoffman lookout, ten miles to the northeast, and Saddle Mountain, eight miles to the south, sent their urgent calls to the headquarters at Forest Grove.

"Fire on Gales Creek."

In the next eleven days developed the largest and most

destructive fire that has occurred in Oregon in the past sixty-five years. Crowning through the finest stand of virgin timber remaining in the State, it laid waste over 300,000 acres of forest land in spite of the determined efforts of nearly three thousand men to control it.

Meanwhile all available men from adjoining mills and logging camps rushed to the scene of the fire. Grimly they fought to trench and hold it. To the tops of snags 150 to 200 feet high licked the flames, burning like enormous lighted candles. Flaming bark sailed into the air and was carried far into the adjoining timber.

Fire patrol headquarters at Forest Grove was a scene of frenzied activity. School busses, trucks and cars were commandeered and in an incredibly short time these started to the fire with men and tools. Food followed later. A call was sent to the nearest Civilian Conservation Corps camp for 100 men.

Shortly after six o'clock, the patrolman at Reher's, near the summit of the Coast Range several miles to the south, reported a spot fire on the south side of the Wilson River road. At the same time, charred sticks, leaves and other light debris were falling in that section. Men were sent in truck loads to attack this new fire. They worked desperately all through the night. In the morning fresh crews replaced them. More C. C. men were sent in. Lines were built and lost as the fire crowned, but the work continued day and night. Toward the end of the week, a slight rain fell and the men went to work with renewed vigor. By Saturday evening, August 19, the fire was practically trailed and indications were that it would be put under complete control.

But on Sunday afternoon hot, dry winds again swept out of the north and east, and immediately the fire worked into the crowns. Hissing and roaring it rolled on through the timber. Myriads of burning brands were showered far ahead. Fire lines were wiped out. A wall of flame and smoke threatened the Reher Camp to the northeast. Two other camps, containing 200 C. C. boys, lay directly in its path. A runner was sent in to order them out. They evacuated just in time.

About this same time, 175 men were fighting the fire in the vicinity of Saddle Mountain. The terrifying roar of the crown fire, intermingled with the crash of falling trees, descended upon them. They became panicky. Some dropped their tools and started to run. Others stood awe-stricken and terrified, tears running down their cheeks. But the fore-

men kept their heads. Calming the crews they led them through the brush, over logs and up the mountain side. After a mile, with the noise of the fire getting ever closer, and ashes, leaves and cinders falling about them, the men broke out into an old burn and safety.

In the meantime, the Saddle Mountain lookout stood in his crow's nest in the top of a tree 100 feet above the ground and calmly watched the flames sweeping up the mountain toward him. Then he reached for his phone and called the Forest Grove office.

"She's getting close and coming fast," he reported with an amazing calm. "I'm leaving. See you later."

Then he climbed out of the tree, went to his nearby cabin, shouldered his pack, and scrambled down over the cliffs to safety. Shortly afterward the fire swept over the mountain, completely destroying the cabin. The tree was badly scorched but is still standing.

The call went out for more men, and all available labor from Forest Grove and the vicinity was sent to the fire. Additional groups were sent out from Portland. Four additional C. C. camps were moved in, one from across the Willamette Valley.

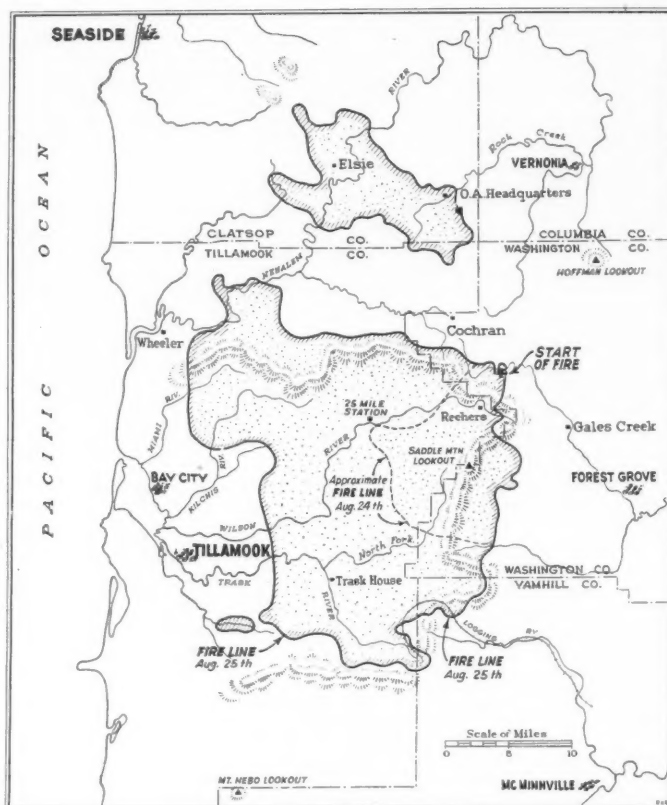
One thousand men were at Reher's. Nine additional fire camps with from fifty to two hundred men each were scattered along the edges of the fire. Forest Grove became as an active wartime headquarters. The army established a supply depot for the purpose of transporting food to the C. C. men. All night and all day

trucks loaded with men, food and equipment rolled out of the town to the fire line. All available experienced fire fighters from other state units, the United States Forest Service and the Pacific Northwest Forest Experiment Station were called in to aid in scouting and directing the work.

Doggedly the battle continued. Trails were built and lost. Down on the southern edge of the fire, a hundred exhausted men had gone into camp. Warily they rolled into their blankets. At two the next morning the foreman was awakened by a distinct roar and crackling. He glanced to the north and saw great streamers of fire leaping through the tops of the trees. A slight wind came through the camp, carrying charred twigs and leaves. Hurriedly the men were called out of their beds.

"Throw all tools and camp equipment into the stream!" ordered the foreman. "Bury the blankets!"

Quickly the orders were followed. Then down the trail the men ran—toward a clearing a mile distant. Louder



The dark line holds in the shaded portion covering the area over which this most terrible conflagration spread.

came the roar of the fire. Trees fell crashing to the ground. Flaming twigs, carried on an increasing wind, fell in the group. Choking with the smoke, the men broke into the clearing as the fire passed a short distance behind them. Next morning they made their way back through the fire, over logs and through the hot ashes, with trees crashing around them. All tools and equipment were salvaged, a new camp established and the fight renewed.

Then came the promise of a break in the weather. Thursday, August 24, saw the wind die down and a rise in humidity. At this time the fire had covered 40,000 acres. With continued favorable weather, there was a chance of success in the fight. But it was not to be. The awful conflagration that broke out early Friday morning and raged until late that night far eclipsed anything that has occurred in Oregon since the historic Coos Bay fire of 1868.

Before daybreak the following morning the town of Cochran on the northern edge of the fire reported a brisk east wind. The humidity was down to twenty-six per cent, an unbelievably low figure at that time of day. A check at



Eyerly Aircraft Photo.

The northeastern edge of the fire several days after it started. Hissing and roaring, relentlessly it tore on through the green timber, showering myriads of burning brands far ahead.

headquarters gave a humidity of thirty with a hard wind blowing directly out of the east. The reports were received in silence by the tired group gathered there. Through past experience with fires, wind and humidity, those men who were directing the fight knew what was in store. It was all summed up in the terse remark of one man, who spoke in a hushed voice as though talking to himself: "Hell's sure goin' to pop!"

The chief stepped to the phone and called the warden's headquarters at Tillamook. "Get all fire fighters and all families away from the west side of the fire," he ordered.

Cars were immediately sent up the Wilson and Trask Rivers. Into these, men, women and children, with a few of their personal belongings, were loaded. Through the blinding smoke and heat, with burning brands and debris falling all around them, the cars made their way to safety. On the road large droves of deer were passed, walking or running, forgetting their terror of man in the greater terror of fire.

With daylight a spectacle unfolded before the eyes of the people of northwestern Oregon that has seldom fallen to the lot of man to witness. Over a fifteen-mile front a solid wall of flame leaped through the tops of the trees. Upward in great white clouds the smoke billowed, leveling off into a mushroom shape at an elevation of about 9,000 feet. Then through the top of this belched great clouds of smoke, rolling and churning to a tremen-



The loss of animal life was appalling—many charred bodies of deer were found—in most instances lying with their heads toward the West, as they fell exhausted in their terror-stricken effort to escape.

dous height, giving an indication of the terrible heat generated by the holocaust beneath. Aviators carrying observers from the protection agencies estimated that the smoke columns reached a height of 40,000 feet. The wind was so terrific that the pilots refused to take their planes near the fire, fearing they would be drawn into the flames.

Enormous Douglas fir trees were uprooted. Others were splintered and broken. Trees and brush, tossed by the cyclonic fury of the wind, lay in twisted, tangled masses. A terrible suction, just ahead of the flames, caused great trees to fall directly toward the fire to be immediately engulfed. Rock cliffs were cracked by the terrific heat. Loosened material rolled down the mountain sides in avalanches, carrying everything before it. Through it all was the crash of falling timber and the hissing, crackling roar of the fire. Great masses of burning debris were carried far into the air. Two men stood on the Hebo lookout, a few miles south of the fire, and watched a ball of flame rush high into the air. Then east winds caught it and carried it swiftly westward where it fell seven miles ahead of the main fire in a dense stand of spruce timber. Almost instantly another crown fire developed and rolled on toward the coast. By mid-afternoon the fire had spread over a twenty-five mile front and was still being carried relentlessly westward by an east wind toward the cities along the coast.

Early in the day the coast region for a distance of thirty miles along the front of the fire became overcast with smoke. Objects took on a weird, unnatural appearance as the sunlight filtered through. Later a dense, peculiar darkness engulfed the country. City lights were turned on and chickens went to roost. Motor cars attempted to pick their way along in a smoke denser than any fog that ever rolled in from the Pacific. Ashes, fir needles, leaves and charred twigs fell so thickly on the coast cities that they could be scooped up in shovels. On the incoming tides of the Pacific, great masses of debris were carried and deposited along the beaches to a depth of over two feet.

Shortly after noon came a message from the twenty-five mile station on the Wilson River where fighters had been sent the previous day. "We are going to stay," reported the warden. "There's no need to worry for we have the river, plenty of food, a pumper and quite an area of cleared land." Then apparently as an afterthought, he added: "The fire is leaping through the tops of the trees all around us right now."

This group of men, twenty-five in number, set the pumper near the river, laid out their hose and wet down the

buildings as the fire scattered burning brands over the entire clearing. That afternoon the telephone line went out. Two bridges across the Wilson River were burned. Then it passed on. The men were safe. Later it was learned that the warden's wife and child had remained with him. Two days later they all made their way out on foot, none the worse for their harrowing experience.

Then to add to the woes of an already weary fire fighting organization, an incendiary set fire to a slashing about six miles to the north. Hundreds of men were sent in. They had hopes of controlling it before night, but weather conditions were against them. The east winds carried it through the slashings and into the green timber. It immediately crowned and by evening the head of the fire was eighteen miles away from the point of origin. Over 60,000 acres of timberland were burned—an immense fire in itself—but dwarfed in size and importance by the terrific fire to the south. Three hundred C. C. C. men from the Mount Hood National Forest were sent in. Half of them went to the southern edge of the fire, the other half to Camp McGregor of the Oregon-American Lumber Company. About seven o'clock in the evening, the wind shifted from the east to the west and blew with terrific force. A great wall of flame came rolling down onto Camp McGregor. As the fire swept down the hill, employees of the company, their families and the C. C. C. men, fled for their lives and were carried to safety on one of the logging trains. The camp was totally destroyed. Not a building was left.

The difficulties in fire fighting were almost insurmountable. Many areas were so badly cut up by rock cliffs and steep hills as to make fire line construction an impossibility. No roads bordered the fire on either the north or south, and only stub roads on the east and west. Packing became a problem. A warm, humid climate had developed a forest of the rankest growth. Ancient Douglas fir trees in many places formed a stand as heavy as 100,000 board feet to the acre. Underbrush consisting of vine maple, salal, devil's club and other forestal growth made an almost impenetrable mass. The accumulation of decayed vegetation, peat-like in character, lay from six inches to over a foot in depth. First swamper cleared away the underbrush. Then came the men with shovels and hazel hoes, digging a two-foot trench down to mineral soil. It was slow work. But in spite of it all, the entire east side was trenched and held during the fire.

Darkness came at last but not to blot out the scene. The belching, billowing smoke, (Continuing on page 523)



Thousands of acres of Oregon's finest Douglas fir trees lay in the path of the flames—trees and brush, tossed by the cyclonic fury of the wind, lay in twisted tangled masses.



CANADA'S CONSERVATION EFFORTS BRING BACK BUFFALO HERDS

FOLLOWING the pioneer work of the United States, the effort Canada is making to preserve its wild life is one of the really hopeful signs in an age when the ruthless decimation of the world's remaining animals is still too rampant. Particularly is its re-establishment of buffalo herds an outstanding achievement. Since the first efforts at preservation exactly a quarter of a century ago, the original herd of 716 purchased by the Canadian Government has increased to 20,000.

The buffalo, or in strict parlance, the bison, has been described as the "grandest ruminant that ever trod the earth," but its history during the nineteenth century is one of the greatest tragedies in the history of wild life. Of all the quadrupeds, few species ever existed in such enormous numbers, and few have equalled it in value to mankind. Countless millions roamed the prairies, in vast herds that sometimes advanced over a front of twenty-five miles. In spite of this abundance, the extermination of the buffalo was incredibly swift. Sixty years ago they were still numerous, ten years later they were confined to the western plains,

and by 1900 there was not a single plains buffalo in the wild state left in Canada.

Only by taking into consideration the tremendous area over which the buffalo once roamed can the ruthlessness of this hunting be realized. It ranged over more than half of North America, 2,000 miles east and west by 3,000 north and south—from the Appalachians to the Rocky Mountains and from Mexico to the Great Slave Lake, in Northern Canada. For centuries the Indian had hunted it, but not to inflict indiscriminate slaughter, for upon it the very means of his existence depended.

To both the Indian and the early settlers the buffalo meant food, clothing and shelter. Its meat was excellent, its thick robe kept out the winds of winter, tepees and boats were made from the hide, and tools from the bones and the horn. These very properties of utility spelt its doom. With the coming of the railways more and more speculators poured out onto the prairies, and were quick to exploit the unhappy monarch as an easy medium for acquiring wealth.

Thus began the worst orgy in the destruction of wild life

that the world has probably ever seen. The buffalo was helpless against the rifle of the white man, as contrasted with the primitive weapons of the Indian, whose inroads were insufficient to check the natural increase of the herds. The demand for buffalo robes and leather was enormous, and the result was that single hunters would shoot down as many as 3,000 beasts in a season. Not satisfied with this, armed bands often hundreds strong, sallied forth, and slaughtered buffaloes by the thousand. Frequently the hunt was carried on for the mere pleasure of the chase, only the tongues of the ani-

He turned them wild on a part of the Flathead Indian Reservation in Montana, and they increased to about a thousand in number. But in 1906 he lost his grazing grounds when the United States Government decided to throw the reserve open to settlement, and Pablo was faced with the necessity of getting rid of his buffaloes. Many people urged the United States Government to purchase the herd, the scheme being backed by Theodore Roosevelt and others interested in the conservation of wild life, but Congress would not sanction the project. Wasting no time the Canadian



In the Great Slave Lake district in Northern Canada today, these monarchs of the plains are free to roam, following their own will, exactly as their nomadic ancestors did of old, when the herds numbered countless millions.

mals being taken for food, and the carcasses left to rot on the plains. By the end of the century the only known surviving buffalo, in addition to a herd of considerable numbers owned by Michael Pablo of Ronan, Montana, consisted of a small herd in Texas, another in the Yellowstone National Park, a few at Banff National Park, Alberta, and some hundreds of "wood buffalo," a larger type, living in the then nearly inaccessible and uninhabited regions lying around Great Slave Lake. Feeling that this magnificent beast should be preserved for posterity, the Canadian Government in 1907 seized the opportunity of purchasing the greater part of the surviving buffaloes in North America by acquiring 716 animals from the Pablo herd.

The story of how the shrewd half-breed, Pablo, came by these animals is something of a romance. In 1873, Walking Coyote, an Indian from the Columbia River country, crossed the Rockies to the Blackfoot country, and married a girl of the tribe. Unfortunately for him, he already had a wife, and in addition had broken the law of his tribe by marrying outside it. As a peace-offering to the Flathead chief, he took back four buffalo calves, two heifers and two bulls, which he had caught in the country which is now Alberta. The buffalo was unknown on the western slopes of the Rockies where the Flatheads dwelt, and here after a little time, the four calves came into the possession of the Mission of St. Ignatius, which was working among the Indians. Under its care they thrived, and in 1884, Michael Pablo bought ten from the Mission at \$250 each.

Government stepped in and purchased for \$245 a head as many as could be caught and delivered to Elk Island National Park at Lamont, near Edmonton, Alberta. This Park, which had been opened a few months earlier, was used as a temporary home while Buffalo National Park at Wainwright, Alberta, was being prepared.

The task of transferring the buffaloes to their new home did not prove an easy one, for the animals were practically as wild as those which once roamed the prairies. It took the most experienced cowboys of Montana nearly three years to round them up. The first train load of 199 arrived at Lamont in June, 1907, and another 211 were delivered in October. During 1908 the remainder of the herd was corralled in Montana but they were so wild that they smashed down the barriers, and by climbing an almost sheer precipice escaped to the mountains. Next season they were again caught, and each beast imprisoned in a huge crate. At Ravalli, Montana, it required a week to load them for shipment direct to Buffalo National Park, then ready to receive them.

Elk Island was used until June, 1909, when that part of the herd comprised in the first two shipments was removed to its new home in Wainwright, with the exception of sixty-nine animals, which were left as the nucleus of an additional herd. So well have they flourished that in December, 1931, there were 945 in the park. Buffalo National Park, which was visited by 13,000 people in 1931, is situated on the main line of the Canadian National Railways, 127 miles east of Edmonton, Alberta, and 199 miles west of Saskatoon,

Saskatchewan. It required approximately 1,700 miles of wire and 25,000 posts to fence the original area which has since been enlarged to 197 square miles, or about 125,000 acres. The steel wire fence, nine feet high, is ninety-five miles in length, and fire guards twenty feet wide are plowed on each side as a protection against the ever present menace of fire.

The entire territory in that area is particularly suitable for the buffalo. There are many evidences of its having been occupied by the monarch during the past century. In the summer the animals are allowed to roam wild, but during the winter the cows and calves are brought into a special enclosure fenced off from the main range. Here they find pasture for about two months, and afterwards when the weather is severe, hay and straw are given to the herd.

During the season of 1923-24, the strength of the herd threatened to over-tax the grazing capacity of the Park, which is able under normal conditions to support about 5,000 animals. At that time 1,847 buffaloes were slaughtered under humane conditions and the meat and hides sold. In subsequent years for the same purpose similar thinnings have been made, a total of over 7,500 animals having been slaughtered. During the years 1925-28 a new avenue for the disposal of surplus animals was followed. In 1922 a Government survey showed that from 1,500 to 2,000 woodland buffalo were roaming on a natural range in the Great Slave Lake region, near Fort Smith in the Northwest Territories. The fact that these animals were thriving suggested that probably the buffaloes from Wainwright would likewise thrive there. In order to prove this, Wood Buffalo Park, a preserve of 17,300 square miles, well-watered, and with abundant grazing, was set apart and the killing of buffalo by any one, white or Indian, absolutely prohibited.

In the season of 1925 the first experiment was made of moving 1,634 yearlings and two-year-olds to their new northern haunts. This meant a journey by rail and water of nearly 700 miles. The beasts were first corralled at Buffalo Park, branded, and loaded into special cars divided into sections, and left for Waterways, the end of the line. After this journey of 400 miles they were unloaded into special corrals, allowed to rest for thirty-six hours, and given plenty of food and water. Then came the last section of the journey, 257 miles by water. The animals were loaded on to

huge barges designed for the purpose, which were in tow of small steamboats. The destination at La Butte, on the eastern boundary of the Wood Buffalo Park, was reached six days after the buffaloes left Wainwright. It is said that towards the end of the time they became tame enough to eat out of their keepers' hands. At La Butte a special wharf with a laneway to the shore was in position. The barges were moored to the wharf and the gates of the pens opened. With a headlong rush the animals made for the shore, but soon settled down in their new surroundings.

This movement, as already stated, was carried on during the years 1925 to 1928, inclusive, when nearly seven thousand buffaloes were liberated. The game wardens report that the prairie buffaloes are in first-class condition. They can be seen at times grazing along the shores of the Slave and Peace Rivers, but for the most part keep to the inland recesses.

At the end of 1931 the Canadian Government, in continuance of its policy of establishing certain species of native wild life in selected areas, established another buffalo herd in the newest of its National Parks, Riding Mountain, in Manitoba. In November two carloads of the animals were moved from Wainwright to Ashville, where they were loaded on motor trucks and transported south into the Park. The area chosen for the experiment is rolling country near Lake Audy, and forms part of the immense territory over which the herds used to roam.

Sixteen three-year-old cows and four four-year-old bulls were corralled for the purpose of establishing this new herd. The number of bulls was small because of the terrific battles which frequently occur among them. The latter were shipped in special crates, each one made to measure. Cows of any age can be moved in carloads of from twenty to twenty-five, but with bulls this is impossible. In this case the sixteen cows were herded loose together, and at the end of the journey were first introduced to their new home. The bulls followed, and finding the enclosure already occupied by members of their own species, they soon adapted themselves to the surroundings.

In spite of these efforts to establish new outlets for the extra buffaloes, and the fact that nearly 7,000 have been sent north, the herd at Wainwright (*Continuing on page 523*)



A full-grown buffalo weighs from 2,000 to 2,100 pounds. This shows an interesting close-up of part of the herd thundering in during a round-up at Buffalo National Park in Canada.

THE GREAT LIGNIN MYSTERY

Uncovered Years Ago in Paris, the Unsolved
Problem of the Great By-product of Field
and Forest Still Puzzles Chemists of To-day

BY LOUIS ELSBERG WISE

THE casual tourist, wandering through the gray, ancient *quartier* of Paris, near the Porte St. Denis, may be surprised to see sprawling before him a massive, sombre old building. This is the Museum of Arts and Crafts, landmark of France's accomplishments in engineering and industry. Let him wander through the portals of that huge vault and he will view with delight well planned exhibits, historic apparatus and equipment, and delicate, precise, miniature models of all types of machinery. It is doubtful, however, if he will stumble upon the bust of a chemist, long dead and forgotten, who worked in the laboratories there a century ago. This bust, grimy and inconspicuous, commemorates the work of old Anselme Payen, who first uncovered the great lignin mystery in 1838. Payen had always taken a special interest in the chemistry of woody plants. He had treated wood with most of the reagents standing on the shelves of his dingy laboratory—alcohol, ether, acids and alkalis. And as a result of this insatiable curiosity he found that all the woods yielded the same resistant, fibrous substance known as cellulose—the substance which in one form or another enters the paper, rayon, cellophane, textile, explosive, lacquer and photographic industries of to-day. At the same time, Payen made another interesting though less sensational discovery. He found that in isolating this cellulose, in separating the tiny, individual cells from each other, he was always forced to remove—often to change or destroy—other components of the wood. These weaker, less resistant substances, which he christened *les matieres encrustantes*, cemented together millions of cells in the bole of the tree, and also reinforced the cellulose within the individual cell. *Les matieres encrustantes* were later renamed "lignin."

Payen studied his lignins patiently and tenaciously. Like all good chemists he strove to penetrate into the architectural pattern of the lignin molecule. There were only three distinct types of atoms present—carbon, hydrogen, and oxygen. Unfortunately, however, the molecule was built up of scores of these very atoms, and the permutations and combinations were baffling. So Anselme Payen failed, but it was a noble defeat after an exhilarating struggle. Scores of chemists since his day, equipped with far better and more delicate tools, have wrestled with the same problem with equal futility. Nearly a hundred

years have gone by, and the mystery of lignin still lies well over the horizon.

Why then should lignin interest or disturb the layman? This question is best answered with a few bold statements. Lignin is one of the greatest chemical by-products that the forests have to offer us. Twenty to thirty per cent of dry wood is made up of lignin. It is one of the largest agricultural wastes in the world. From fifteen to twenty-five per cent of those wastes is composed of lignin.

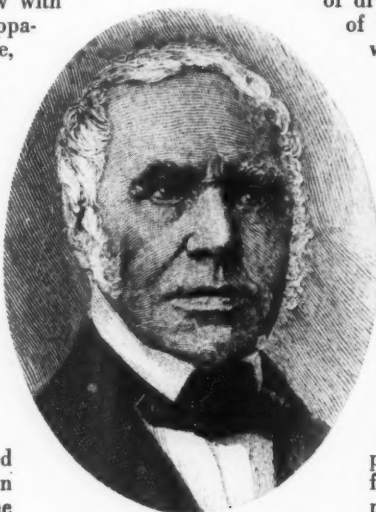
Considering the combined losses from pulp mills and agricultural products, probably forty million tons of lignin are lost annually in the United States alone. When, to this conservative statement, are added the facts that lignin, like cellulose, is an end-product of solar energy, free from tariffs and taxes, growing without benefit of technologist or technocrat, that it has a much higher fuel value than that of cellulose, that it is the probable forebear of soil humus, of peat, of lignite and of certain coals, and that it contains chemical groupings that point strongly towards its industrial usefulness, the reader will be alive to its present and future importance.

Forty million tons of waste lignin!

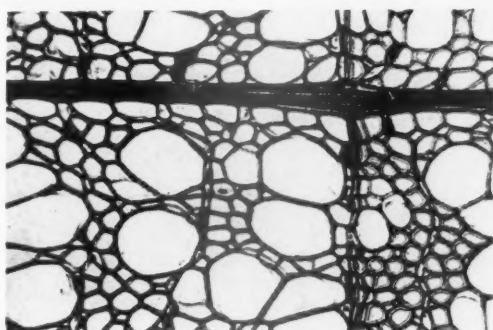
What is it chemically? By what complex mechanism is it produced in forest and field? What use can be made of it? How should it be disposed of? Those questions probe the heart of the lignin

mystery as it appears in 1933. There is no object in reviewing the progress made by chemists in grappling with the structure of the intricate lignin molecule. No need to relate how a clue here, a blazed trail there, have led them through a bewildering labyrinth of studies in the laboratories of America, England, Germany, France, Scandinavia, or Japan; or how chemists, through the use of improved instruments, have found that the lignins from straws, despite their kinship, are different from those of the softwoods. How these, in turn, differ subtly from those of the hardwoods. How *all* lignins have certain characteristic earmarks, certain tell-tale groups in common. It has been a gruelling, difficult struggle, with the end not yet in sight. Suffice it to say that the "century of progress" has been a worthy, not a wasted one.

Looking at the more practical aspects of the lignin problem, has that enormous waste tonnage found any use at all? The answer, hedged in with all sorts of reservations,



Anselme Payen,—the French chemist who first uncovered the great lignin mystery. (After a photograph by Pierre Petit.)



A minute, thin section of untreated Basswood. (Magnified 150 times.) Note its architecture under the microscope.

William M. Harlow

is a qualified "yes." Lignin is being used by industry, but its uses are crude and primitive, and they account for only a small fraction of the product which accumulates from year to year. Often they depend on the physical rather than the chemical character of the substance. Its few purely chemical uses literally batter the lignin molecule to pieces. For example, in the destructive distillation of wood, methanol (wood alcohol) emanates from the lignin. Wood cellulose and the other constituents of the wood when heated fail to give this product. But in the process of methanol formation, the constitution of lignin is hopelessly shattered. Besides, methanol is now produced very economically and efficiently by synthetic means from hydrogen and the poisonous carbon monoxide. In fact the synthetic product actually exceeds in amount the methanol formed by wrecking lignin. To the chemist there appears to be a parallelism between the lignin situation of 1933 and the good old days when coal tar was exploited with equal crudity, just before it was known to yield hundreds of brilliant dyes, valuable drugs, high explosives, powerful preservatives, potent disinfectants, and intriguing perfumes.

Despite their obvious drawbacks, the industrial functions of lignin merit attention. In all phases of the lumber industry lignin remains part and parcel of the final product. In groundwood pulp, an important raw material for newsprint paper, lignin is always present. Here, however, it makes for neither durability nor strength. Sunday editions of the metropolitan dailies fall to pieces rapidly in the hands of the omnivorous readers. One of the factors responsible for this impermanence is the lignin hiding within their short-lived pages. Special deluxe newspaper editions, free from all lignin, have been introduced. High grade magazines fur-

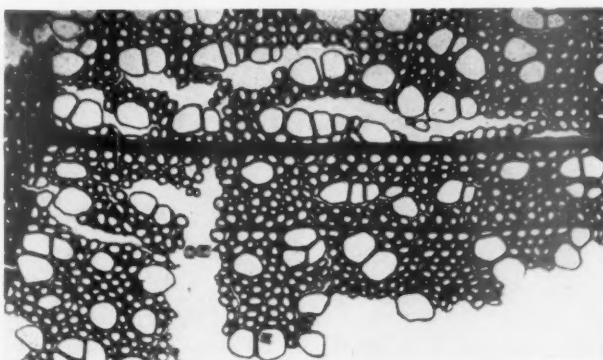
nish their subscribers regularly with a much stronger pabulum. Their dignified pages are almost completely delignified, and hold their own against time and harsh treatment.

Of course the permanence of paper does not depend exclusively on the absence of lignin. Far from it. The length and strength of the cellulose fibers, the type of cellulose used, and its chemical pretreatment in the process of manufacture, are all very important factors. On the other hand, lignified raw materials have never been an answer to the papermakers' prayer, and lignin has always been an expense and a sort of *bete-noire* to the paper industry.

Hence in the production of chemical pulp, by any of the processes used today, lignin is largely removed, and the residual cellulose fibers play the trustworthy role of a well-behaved raw material. No matter what chemical means is used in converting wood into pulp, the principle remains essentially the same—get rid of the

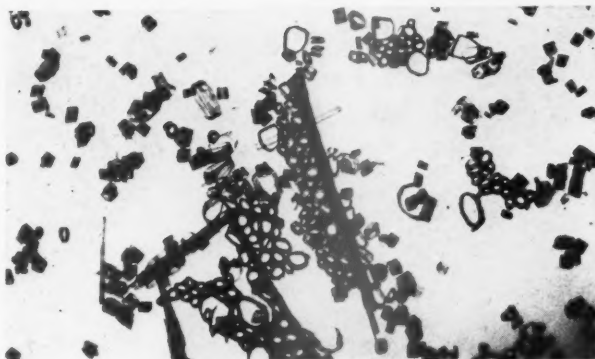
lignin as far as possible, but be careful not to hurt the cellulose. In these chemical treatments, what is the ultimate fate of lignin, step-child of the paper industry? As an example, take the case of sulfite pulp production. Here spruce chips are "cooked" under pressure with liquors containing sulfuric acid and calcium bisulfite, in huge acid-proof digesters. Suffice it to say that it effectively removes the lignin from the cellulose. Later, in the "waste liquor" are found certain sugars — degradation products

of the original wood—but their main component is lignin, sadly changed but still recognizable. In some obscure fashion it has combined chemically with the sulfur and



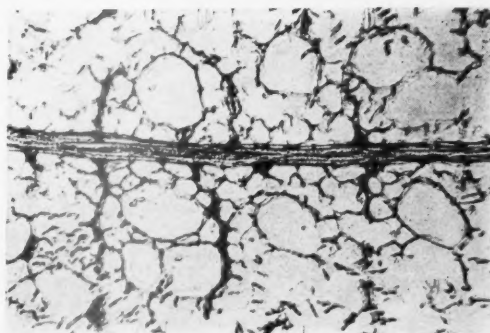
Basswood, — watch the process of chemically delignifying the original wood. Individual cells are being loosened from each other, as the lignin dissolves. (Magnified 75 times.)

William M. Harlow



A photomicrographic study of a later stage in the removal of lignin "cement." Disintegration follows, and the remains consist largely of cellulose.

William M. Harlow



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Basswood lignin. The result of treating this wood with sulfuric acid. The useful cellulose dissolves. The lignin mystery remains, a filmy shadow of the original wood. (Magnified 150 times.)

the lime during the "cook," and thenceforth it masquerades under the name of *calcium lignosulfonate*. The chemist hasn't quite decided just what this name really means. What he does know is that in the United States and Canada some two million tons of this product are manufactured every year, and that no one knows what to do with most of it. Dr. Henry K. Benson, in a recent treatise on the chemical utilization of wood, compiled for the Department of Commerce in 1932, says: "The obscurity of the lignin structure is perhaps the greatest handicap in drawing up an intelligent program of research for its conversion into marketable products."

Despite the brilliant efforts of the chemical engineers the waste sulfite liquor, alias *lignosulfonate*, still finds its way into the sewer. Smaller streams are still polluted with the effluents from pulp mills. Fish are killed. Offensive, mephitic algae still grow at the expense of this great national, organic waste.

The picture should not be painted in too sombre a tone. There are flecks of sunlight. In Wisconsin, through the efforts of G. C. Howard, they have discovered that the waste liquors may be fractionally precipitated by means of lime. Such treatment yields: calcium sulfite,—which may be used over again in fresh cooking liquor—lignin, that can serve as fuel, and a solution of sugars and salts which may be run into the river without serious damage to the fish. Apparently the operation may be carried on without financial loss, and perhaps, at some small profit.



Photograph by E. S. Harrar

About one fourth of the dry weight of the Basswood tree is lignin,—that elusive substance which is still one of the greatest chemical by-products of the forest.



Photograph by E. S. Harrar

Red Spruce furnishes cellulose to the paper, rayon, and cellophane industries. The dry wood contains over 25% lignin, for which chemists the world over are still trying to find a suitable use.

This is one of the many hundreds of schemes to prevent sulfite wastes from injuring and clogging the smaller waterways of the Western world. As early as 1886, several patents, British and German, sought to correct the pernicious influence of pulp mill effluents. Several countries had already enacted laws against the waste sulfite nuisance. In 1898, when the German plants at Unterkochen and Wolfash offered a cash prize to the man who could render harmless their tide of sulfite waste, eighty-three chemists and engineers came to the rescue with clever suggestions,—most of which were entirely impracticable. In 1919, articles and patents on the waste sulfite liquor problem had accumulated to such an extent that the Canadian Forest Products Laboratory filled a monograph of 190 pages in briefly reviewing the literature on the subject.

Nevertheless, calcium lignosulfonate has a few promising uses. Take its road binding property as an example. The adhesive qualities of concentrated waste sulfite liquor were recognized fifty years ago. Ullmann, an Austrian chemist, proposed in 1890 its use in briquetting wood, coke and coal. Since that day sulfite binders have appeared on the market under a variety of trade names, but only recently has their usefulness in laying dust on the surface of roadways received serious attention.

According to Dr. Benson's report, "the lower half of Sweden has been made practically dustless with sulfite liquor." This liquor was con- (Continuing on page 524)



EDITORIAL

The Forestry Corps on Review

THE initial enrollment period of the Emergency Conservation Corps ended September 30. Three hundred thousand young men whose summer work camps have been "mustered out," and at the same time given the opportunity to "reenlist" for another six-month period. Early in the month, estimates of the probable drop-out ranged from twenty-five to fifty per cent, but the Administration anticipated no difficulty in filling the vacancies, and plans have gone ahead full-speed for a program of winter camps and winter work for 300,000 men. Camps already built from which work in the woods or in the open country can be advantageously done during winter months are being put into condition to keep the men warm and comfortable while new camps are being located to replace those in regions where winter work is impracticable. Some twenty-five new camps are to be established in the Tennessee Basin to integrate with that project, while as many more new camps will be established on areas recently acquired in connection with the \$20,000,000 acquisition program.

It is too early for a conclusive appraisal of the Emergency Conservation project but certainly the experiment thus far has well demonstrated its worth and the soundness of its conception. Criticism there has been, some of it justified, more of it unjustified and indulged in by uninformed or prejudiced persons who sometimes magnified small or exceptional troubles. It would have been a miracle indeed for any undertaking of similar magnitude and involving almost a half million men from all walks of life to have been put underway without some criticism. It was to be expected that a certain number of undesirable characters would be enrolled in the haste to organize the project and provide work as quickly as possible. It was to be expected, too, that the heavy machinery of Government, strained under other large projects, with responsibility divided between departments and with participation by forty-eight states involved, would not move with exact precision. That the project has been organized and carried through its initial period with so few delays and so little cause for merited criticism is in itself high tribute to the organizing and cooperating ability of the responsible Federal and state agencies.

Putting the undertaking on review as it has now "struck its stride" and assuming that it will continue along the same high-purpose lines, the project, we believe, will go down in history as one of the great accomplishments of President Roosevelt's administration. Those intimately familiar with the many camps, the men in them, and the diversified work radiating from them must admit the far-reaching value of the project in point of relief to the 300,000 men enrolled, to

their dependents and to the hundreds of communities adjacent to the camps. They must also credit the great amount of work which these young men have done and are still doing. Their activities have been many and diverse and although values may not be immediately apparent it is work that will bear fruit in years to come. The money spent represents capital investments in the building of a better America. In its larger significance, the C. C. C. may well mark the definite close of an age of destructive exploitation of natural resources and the dawn of an era of restoring and conserving wealth producing processes of nature.

But there are weak links in the Civilian Conservation Corps as now operating. One is its educational side. Commenting editorially some months ago this magazine expressed the opinion that the educational opportunity offered by the project forms the key to its highest ultimate success. Amid the stress, confusion and difficulties of organizing the projects, the educational side, unfortunately, has been forced into a secondary and incidental place. For the project as a whole it lacks organization, definite purpose and specialized personnel. In many camps where there happens to be someone interested, educational opportunities are being well met, but in great numbers of camps, one finds educational activities disorganized, uncoordinated and inadequately formulated. And as between camps, there appears to be no unity of educational purpose or program. In just as far as these lacks continue the project will settle on a plane of material work, and the human significance of it all will remain dull, hazy and questionable in the minds of the 300,000 youths performing it. What seems specifically called for is centralized organization of educational activities, including formulation of a corps program by competent educators and adequate provision for carrying it out systematically.

Another respect in which the project is open to criticism is the taint of political patronage given it by an order issued last July requiring that men needed to refill certain supervisory positions be selected from names recommended by local Congressmen. Limited though the order is in its application, it nevertheless colors the project with the name and influence of patronage and raises the constant threat of further politicalization. Once the project in the eyes of the public receives the label of political patronage fair recognition of the value of the work will be impossible, public support will turn cold and the whole undertaking will come to an untimely end. In the interests of preserving the high-purpose integrity of the project and of assuring its rightful consideration as a permanent instrument in promoting social and economic welfare, the Administration should rescind at once the order in question.



"SACRED"

DEER

By

FRANK A. WAUGH

A young buck in Nara, growing horns for souvenirs

IN Nara, the ancient capital of Japan, two things attract the exclusive attention of all visitors, whether they be foreigners or natives. These are first, the old temples and, second, the herd of protected (sacred) deer.

There are about one thousand of these deer and they run at large. For the most part they inhabit the temple park, which is in reality a mountain forest of about 1,300 acres. As this park is contiguous to the city and as the deer are petted and encouraged by various means, they constantly drift to the city streets. What the outer limits are I did not learn, but there must certainly be some way of restraining them from the neighboring gardens and rice fields.

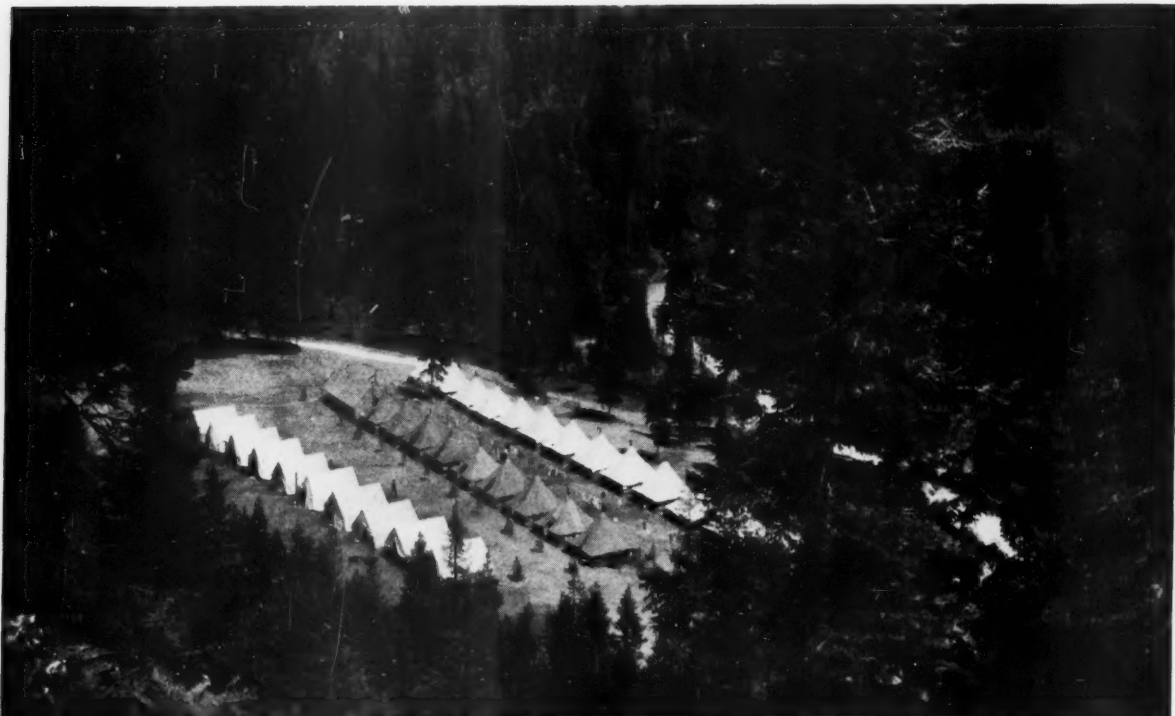
The important fact is that this large herd of free deer has been maintained for hundreds of years in a thickly settled and highly agricultural community. The responsibility for their keeping and control is shared by the officers of the local temples and the civil government of the prefecture. The latter, I am told, makes an annual grant of money for their support. The most obvious act in the management of the herd is the shiki-no-tsunokiri, or the dehorning festival. Once a year, in October, there is a roundup and any bucks with dangerous antlers are deprived of their weapons. This roundup provides a grand spectacle and spree for the country yokels, and possibly for others. The horns become the property of the chief shrine. Here they are collected and blessed with suitable ceremonies, after which they are manufactured by skillful local craftsmen into chopsticks, paper knives, shoe-horns and everything else which visitors will buy. A considerable revenue is collected from this source.

However, this is nothing to the amount of fun which visitors derive from the deer. The animals are quite tame and come nosing about to be fed. Dozens of insistent old women wait about the street, to sell ten sen worth of cakes for this performance. Almost everybody lingers to play with the deer, and every kodak and movie camera comes into action. School children or bridal couples like to be photographed surrounded by these dappled beauties, and a score of professional photographers are on hand for the service. Putting the matter in its most abstract and poetic ground it could quickly be allowed that the presence of these quiet, graceful and beautiful animals in the park gives it a distinctive atmosphere never to be neglected nor forgotten.

In short, here is a permanent and comparatively large herd of deer, maintained in a thickly settled area and compelled, in a manner, to pay its keep. The utilization of the horns is a novel idea to the United States but might possibly be adopted to a limited extent under special conditions. The outstanding utility here is obviously the recreation value. All the authorities evidently set a high estimate on this; and if a few hundred yen each year are appropriated to cover an operating deficit the transaction is quite as valid as many of the advertising jobs resorted to by American chambers of commerce or boards of trade.

The point of the case lies in the recognition of the deer herd as a public utility and in its intelligent exploitation for social ends. Aside from stressing their out-and-out recreation value, there is the novel expedient of taking a revenue from the horns. It suggests that further study of American problems may reveal improved methods of herd management and new ways of deriving some financial return from game colonies.





In the silence of the forests of Western Montana—a C.C.C. camp, made up of young men from the East.

WHEN EAST GOES WEST

How Thousands of C.C.C. Boys from the Sidewalks of Great Eastern Cities
Have Reacted to the Forest Environment of the West

By NELSON C. BROWN

WHEN Horace Greeley uttered his now famous "Go West, Young Man!" it is doubtful if he dreamed that within a generation thousands of youths would be literally transplanted, almost overnight, from the noisy confusion of great eastern cities to the silence of the solitudes of the west. Yet this is what has happened in the great Emergency Conservation Work project of President Roosevelt. Young men accustomed to glittering lights, the din of traffic, the rush and swirl of subways were suddenly thrown into a world very few of them knew existed.

In place of never ceasing turmoil and clatter they found themselves in a land where the call of a bird can be heard the distance of ten city blocks and more. From stuffy homes and tenement houses they found themselves sleeping under the stars. And from an environment of man-made skyscrapers, concrete streets and mechanized factories, they found themselves catapulted into the heart of mountainous nature, overpowering, mystifying and awe-inspiring in its magnitude. What happened? How did these city-born and

bred young men react to so great a change? I have had a good opportunity to observe, for I have just visited over a hundred of these camps in Colorado, Idaho, Montana, Wyoming, Washington and Oregon. Twenty-five thousand of the men came from New York and New Jersey, chiefly around the metropolitan or densely populated areas. Many of them were of recent foreign origin. Some knew how to work, others had never troubled to learn. At any rate, their way of thinking and working was wholly at variance with their new western surroundings. Some of the camps were eighty miles from the nearest town; and there were no highways directly to them.

Their first reaction was that of loneliness. To a man, almost, they were homesick. But gradually out of a difficult period of re-adjustment and re-alignment of thought and action came the realization of the worth and grandeur and freedom of the new world in which they had been transplanted. They began to "dig in." They found that mountain peaks were to climb, that the forest wildernesses were to



Under the invigorating influence of good food, hard work and life in the outdoors, the physical development of the city boys has been remarkable. Their cheeks are full and fresh and their muscles are strong and bulging.

later, so he slapped him on the back and told him to stick it out a while longer. Two days later the boy came back smiling broadly and with a gleam in his eyes to thank the officer warmly for his advice.

Are they well fed? They say themselves they have gained from five to twenty pounds. Their cheeks are full and fresh, their muscles strong and bulging. They take pride in working with clothes off down to the waist, so they can go home and display their coats of tan. There are plentiful supplies of athletic equipment for various games. There are two excellent libraries, one of a fictional type and the other of an educational nature. These books are kept busy

explore, that the fast, clear streams teeming with trout afforded a sport they had never known. They found interest in trees, in the wild life that abounded among them. They found new desires, new energies—and outlet for both.

Very few of the men went "over the hill" or "eloped," as the Army officers say. I talked with two who had taken French leave. They were on their way back to camp after having hiked twenty-five miles, during which they had thought it over and had changed their minds. At the time of my visit in late summer practically all seemed happy and contented. Their mails were fairly groaning with the weight of letters going to and from their homes. Parents, relatives and friends back East, of course, wanted to know if they were safe and being well treated, well fed and properly clothed. At first, some of them told me, mail from home brought on pangs of homesickness, and the officers often had to buck them up. For example, one officer told me how he had the opportunity to "make or break" a young man temporarily homesick and with a strong urge to go home. The officer knew that if he acceded to the boy's wish both would probably be sorry for it

constantly. Even before President Roosevelt announced that the program would continue for another six months, many expressed a desire to re-enlist and to continue the work. Polls in various camps indicated that from fifty to seventy per cent would remain in the (Continuing on page 526)



What one company of city-bred boys found in July in Mt. Rainier National Park. With genuine enthusiasm they cleared the ground and made their camp habitable and comfortable.

ITS ANCIENT ENEMY DISCOVERED

The Incense Cedar Reveals the Secret of Its Destruction

By ELIZABETH E. MORSE

FROM time beyond knowledge the incense cedar, that beautiful and valuable tree of the Pacific Coast, has been victim of an enemy which has ruthlessly attacked it. For many years foresters and lumbermen have puzzled over those long "pockets" in the heartwood of the trees which have meant ruin.

Because, at various times, a certain species of beetle and numerous ants have been observed as occupants of these inner chambers and apartments it has been assumed by various persons that these insects were responsible for the plight of the trees. At any rate, there seemed to be no escape from the brown pockets, brown rot and honey-combed recesses which impaired trees and so much reduced their value as lumber.

In some regions of the Sierras it seems that there is scarcely an incense cedar that has not been assailed by its enemy. Further north in the Mount Shasta region, however, there has not been so much evidence of the blight. Complete information as to its full extent is not now easily available. But wherever the incense cedar grows it has been observed that there is more or less evidence of this peculiar brown pocket-rot. Hence the questions: What does it? What is it?

The fungus, *Polyporus amarus*, is the guilty agent. The discovery came about largely through observing soft, brownish, punky growths on the trunks. It seemed that perhaps these might have something to do with the rot within. Inquiry and investigation proved the assumption to be true. It is now known that these growths are the fruiting bodies of the fine, white mycelial threads of *Polyporus amarus*. They spread throughout the heartwood of the tree, often to its very summit.

These fruiting bodies—sporophores—may be observed only infrequently, and rarely is there more than one on a tree at one time. This may account for the fact that so little has been

known about them. Once out, the birds tear them to pieces in their search for insects and grubs. The fungus does its destructive work out of sight and unseen.

This fungus works in both living and down trees. The white mycelium which constitutes the

fungus—the emergent growth being the brownish sporophores—may live in the trunk indefinitely after the tree is felled. That is to say, the destruction of the tree may be progressive. There is a record of fungus continuing in a felled tree for twenty-seven years.

The pictures illustrating this article will give some sort of idea of the way the fungus works, or rather, the effects of its work. Notice that the rotted wood breaks up into curious cubical blocks. Sometimes the "pockets" are so wide that the wood is good for scarcely anything, even for underpinning or fence-posts. For this reason lumbermen often find the job of culling the good from the rot-eaten timber quite too expensive. Often logs are thrown aside and thus become a fire hazard. At any rate this fungus destroys enough timber in some districts to be a matter of real concern.

Is there a remedy? Not any of a specific kind or easily or directly applicable. There is a partial remedy and these valuable trees may be saved for themselves and for human use in larger numbers by simple means quite within control. Everyone knows, or should know, that living bodies, including trees, may be attacked by microscopical foes through



Photograph by E. E. Morse

Showing how the wood of incense cedar is rotted into cubical blocks by its ancient enemy—the fungus *Polyporus amarus*. Fine, white mycelial threads of the fungus may be seen here and there.



Photograph by H. E. Roberts

Two young campers in General Grant National Park made a rare find—a large fruiting body of the fungus on an incense cedar log. Such is seldom found even on a standing tree. This may explain why it took so long to find out the main cause of decay in these trees.



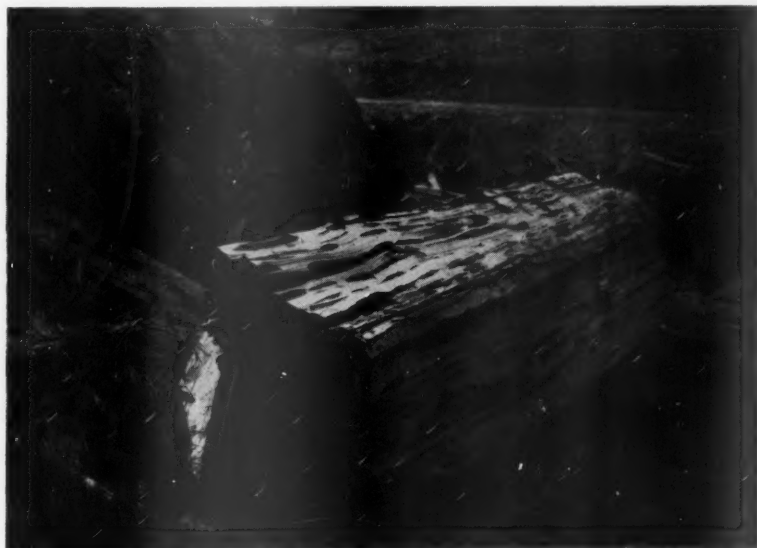
Photograph by H. E. Roberts

Incense cedar dry rot, caused by the fungus *Polyporus amarus*. This picture shows how the rot is found largely in the heartwood, rather than the sapwood, and occurs in the annual rings.

open wounds. Spores, floating in the air, may gain entrance into trees through open wounds made by fire, storms, birds, animals and human beings. The grazing of a tree trunk by an automobile wheel hub often makes an ugly wound. The thoughtless person who tries out his ax or hatchet on a tree "to see if it is sharp" is really committing an assault upon the tree. He makes a wound through which the tree may suffer. It is a sad sight to observe any tree actually bleeding to death.

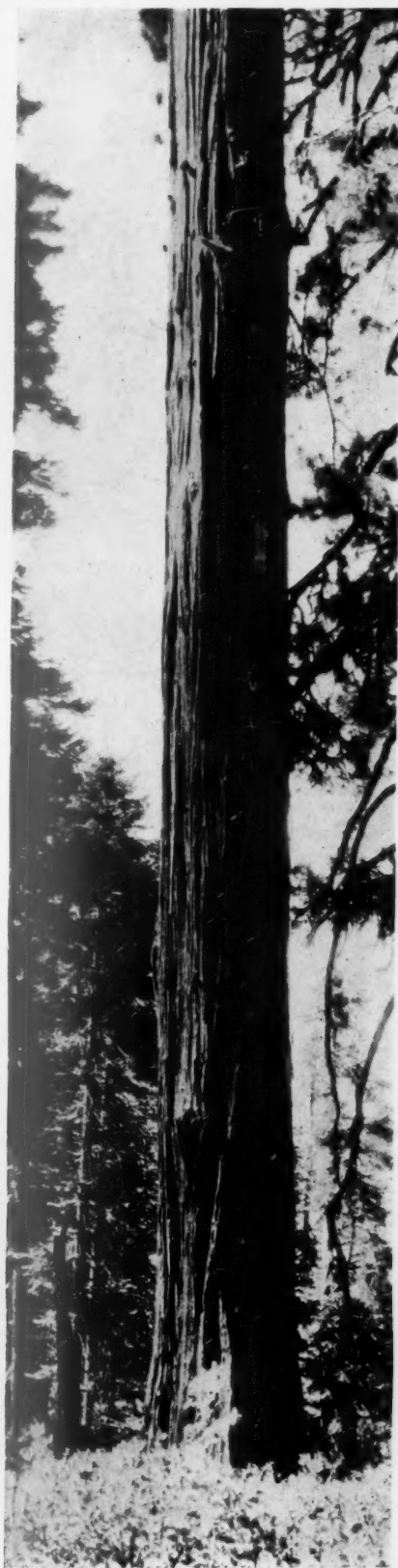
It is stated in a United States Bulletin that incense cedar furnishes valuable wood, but that it is rated as an "inferior species" because of the large amount of "cull" caused by the dry-rot fungus, *Polyporus amarus*; also, that this rot could be eliminated in a great measure by intensive fire protection. The Bulletin mentions that injury from nature's pruning, lightning, and frost is unavoidable. "Trees with sporophores and shot-hole cups must be marked for cutting."

Thus one of the remedies is—SAVE the TREES from NEEDLESS injury!



Photograph by H. E. Roberts

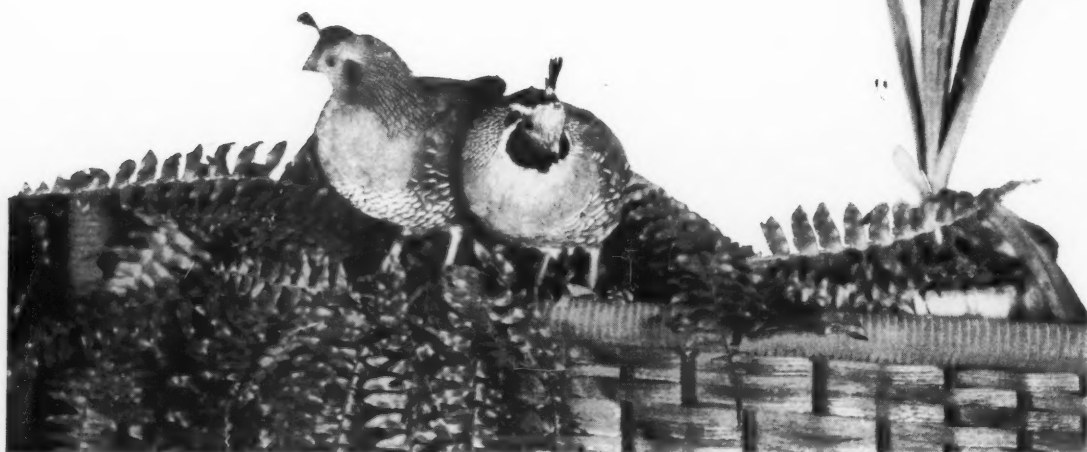
This tree grew in a damp gully below the road to the Big Trees in General Grant National Park. Most of the sapwood had been split off. Certain species of ants and beetles often make their homes in the pockets caused by the fungus.



Photograph by H. E. Roberts

Wrecked by its ancient enemy! The tell-tale fruiting body high on the trunk, also hollow "cups" of former sporophores, show that this tree is doomed and should be marked for cutting.

A FOREST PAGE FOR BOYS AND GIRLS



Don and Donna making themselves completely at home in the fernery.

DON AND DONNA—A TRUE STORY OF CALIFORNIA VALLEY QUAIL

By ELLEN TORELLE NAGLER

DON preceded Donna by nine months. He arrived one sub-zero day in January and was immediately taken into our home and affections. We had understood that California Valley quail were accustomed to human companionship, so we set him free, but he dashed against a window pane in terror and fell, trembling, to the floor. He immediately recovered, however, and looked at us from a corner of the room in which his home, a small screened box, was placed.

Every day his owner, a boy of eleven years, talked to and petted him, and every member of the family acted as a self-appointed steward in supplying him with food. Before long he had explored every part of the room and had chosen a corner as his favorite abiding place. Here, under a large easy chair, he watched us come and go while he waxed fat and round, and his plumage took on a smooth, satin-like sheen.

It was only while we were present, apparently, that he remained quiet. On returning from shopping expeditions or visits, we discovered that Don had investigated the bric-a-brac on top of the book-shelves; he had mounted a table and partaken of the tradescantia which grew there in a vase; he had visited the ferneries in the south windows of the dining room and bathed in the soil of the fern-pots, throwing

the earth out and upon the floor where it lay in a thick, wide circle. He had even mounted the stairs to the second floor and looked out of the windows in the various rooms. Perhaps he hoped to find somewhere a companionship more satisfying to his heart than that which we were able to give him. Perhaps he sought a way to freedom and the glad, wild ways of his forbears. Who can tell what motives stirred him in the quiet loneliness of the place with its unbirdhouse-like fittings?

Certain it is that he understood that the house was vacant, for he never undertook these explorations if one of us remained at home. We did not dare to let him move about freely out-of-doors for there were numerous dogs and cats in the neighborhood with no respect for bird-life. We had found the nest of robins, thrushes and catbirds deprived of their owners too often to trust our pet to the untender mercies of these marauders. Instead, we permitted him the freedom of the house, and he soon became so tame that he followed us about, came at call to perch on a shoulder and remained there even when we moved about.

That he was able to distinguish between us and also between members of the family and strangers is certain, for when the charwoman, or other unfamiliar person, entered the room, he gave a loud cry and flew to us for safety, alight-

ing on the head as often as on the shoulder in his haste to secure protection.

Don readily took food from our hands. He was especially fond of lettuce and would glide rapidly across the room when this was held out to him. He soon learned where the lettuce was stored and he understood that it was distributed only by me, for whenever I approached the place on other errands bent, he followed me and remained looking up expectantly until I noticed him and gave him his coveted morsel. He never begged for lettuce from others.

But Don's happiness was not complete. He yearned for the companionship of his own kind. Early every morning he cried disconsolately: "Wha-ha-hoo! wha-ha-hoo!" His young master interpreted this to mean: "Where are you! Where are you?"

The sad tone in which this question was reiterated so wrought upon our sensibilities that we decided to satisfy Don's longing by giving him a bride.

After dusk one day in October she arrived, weary, hungry, frightened and bedraggled. Her plumage was rough and lusterless. Here and there over her body feathers were hanging loose, apparently ready to fall. She was smaller than Don and without his vivid black-and-white head markings. The little black plume on her head, however, was like his, and she held it as proudly aloft as he. She seemed to possess a marked personality, sweet, yet strong, and we loved this

little bird at first sight with a tenderness never accorded to Don. He was vigorous and aggressive, shrewd and intelligent. She was like a little dove just out of the home nest. We named her Donna, since she would be Don's mate.

This time we were careful to save the stranger from the shock of flying against a window pane. Don had been provided with a cage, somewhat like the cages used for parrots. In this cage was a rod-like perch on which Don was seated, apparently relaxed and ready for his night's sleep, when the crate containing the new bird arrived. As we took her out, he jumped excitedly to the floor, his body tense and straight. When she was placed within the cage he immediately went to her and clucked low, as if to assure her that she need have no fear. She began to pick up grain from the floor and then took a sip of water. Don did not eat nor drink; neither did he leave her side. His eyes fairly gleamed as he hovered near her. After a short time she mounted the perch and Don followed, seating himself close beside her so that their feathers were in contact, then he lifted his wing and covered her with it. They were still seated in this position when the members of the family retired. Often thereafter, during the day as well as at night, we found Don and Donna seated on the perch together and one of Don's wings was laid protectingly over Donna.

Their daily life together seemed to be ideal. Don soon taught his mate how to find his favorite retreat behind the



Don reacted very seriously to his domestic duties, first taking his full part in brooding the eggs and then, when the chicks were hatched, anxiously watched and assisted in their rearing.

living room chair, and she took as much delight in the ferneries in the dining room as he. Since they were able to destroy the plants with their strong beaks in a very short time, we tried to exclude them from this room. It was amusing to see how many devices they invented in order to gain entrance. Don probably worked out the schemes and Donna merely acquiesced, for she seemed to possess less initiative than he.

If the dining room door was left open for a moment Don became aware of it at once and began a stealthy stalk toward it, stopping frequently to see if he was observed by anybody, and if Donna was following. If nobody told him to go back he would advance to the threshold, then give a little chuckle and partly run, partly fly into the room, in the direction of the ferneries. If Donna failed to follow he returned to the doorway and called her. As soon as she joined him both flew into the ferneries and began their depredations, either cutting the foliage of the plants or scratching out the soil from the flower pots.

Don was not often successful in reaching the dining room. His feet made a telltale pat-pat-pat on the linoleum floor of the kitchen, so that he was usually called back before he got to the door. At such times he would stop, turn soberly around and pretend that he was picking crumbs from the floor, although there were no crumbs. Then he would return sadly to his cage.

Since the door between the kitchen and the dining room was well guarded he discovered that he could reach the ferneries by going down the long front hall and through the living room. He used this route several times before his scheme was exposed.

Don furnished us and our friends untold pleasure and amusement. His reactions seemed so quaintly human. He loved his friends and all strangers were enemies. He was tender and devoted to his mate. If he found something unusual he summoned her with a low, whistled call: "Whit-whit! whit-whit!" If she strayed or if we took her away he called loudly: "Cuck-cuck-croo! cuck-cuck-croo!" If she did not appear very soon he seemed to fall into a rage and he then called and scolded until she answered. If they were kept in separate rooms they called to each other, apparently explaining the situation. Several times when thus separated one or the other went to its captor and clucked and whistled and then walked to and from the door which led to deliverance. The one that was free would run or fly to the other and there would be a touching reunion, difficult to describe, but as redolent of joy and contentment as human reunions are wont to be.

Annoyance was expressed by a shrill "chip-chip-chip-chip!" Anger, especially during the mating season, by "Waur! waur! waur!" Hunger, by a softly purred "Queet! queet! queet!" uttered slowly. The danger call was much like the anger call except that the tone clearly expressed fear.

The course of Don's and Donna's comradeship was interrupted by tragedy. One morning we observed that Don behaved strangely and presently he sank to the floor, fluttered his wings a few times, and then lay still in death. Donna walked around him, apparently wondering why he no longer spoke to her, but if she grieved she evidently possessed no means by which she could express such an emotion. His young master wrapped Don's remains in a shroud and put him into a little box which was stored away until the ground thawed so that he might be buried in the garden.

Several months later Don II arrived and he and Donna were given a screened house on the lawn to live in during the summer. Donna seemed to be as faithful to her new spouse as to the first one, but Don II was never observed to put his wing over her as the first Don had habitually done.

The first summer they lived together Donna laid thirteen eggs from which three chicks were hatched.

If the behavior of Don II is typical of all quails it may be stated that the father of quail families realizes his responsibilities. While Donna brooded Don kept watch over the nest-box and gave the anger call vociferously if any cat, dog, or strange person approached the cage. Even the master was not permitted too near his precious family. Don would rush at the boy with beak and claw, calling out reproaches most vigorously.

After the chicks were hatched he felt responsible for their proper rearing. They were fed crumbled hard boiled egg yolk and the parent birds did not help themselves to this, much as they relished it, until the little ones were satisfied.

When the chicks were about a month old they were taught to take sand baths. The sand was in a scooped-out hollow at one corner of the bird house. Donna got in first and indulged in a veritable shower of sand. The little ones walked around her, at the edge of the hollow, while Don stood guard and punished any chick presumptuous enough to get into the bath and so intrude on Donna. He darted from one side to the other and pecked at the offending chick, at the same time uttering his reproaches. After Donna left the bath the chicks went in all together, and rolled and tumbled so that the sand was scattered far. Don did not bathe at this time.

One day, after the young ones were half grown, their young master introduced running water into the bird-house. It was brought from a basement faucet through a small rubber tube. When Don saw the rubber tube which led from the wall to their water vessel he became quite excited and called out shrilly all the words in his vocabulary: "Chip-chip-chip! cheet-cheet-cheet! cuk-cuk-croo!" which their young owner translated into "Look out! Look out! Danger! Danger! Where are you? Where are you?" The little ones hurried to hide behind Donna, who was also greatly excited. All gazed in terror at the rubber tube. When the water was turned on Don leaped backward in alarm and all cried "Waur! Waur! Waur! What is that?" Since nothing startling happened, Don sidled up to the dish, his feathers smooth and ready for flight. "Cuk-cuk-cuk! Why that looks like water!" Donna walked over, looked at it, took a few sips and said delightedly: "Cheet-cheet! Cheet-cheet!" The little ones took no part in the conversation and when grain was brought they all fell to eating, apparently forgetting all about the cause of their fright.

Its rapid, gliding movements and protective coloration enable a valley quail to escape detection in the open. One morning one of the young birds, then about three months old, escaped from the bird house. The lawn bordered a terrace covered with trailing and climbing roses, impenetrable to any but small creatures. In a moment the bird was irretrievably lost unless it chose to return.

It occurred to us that he might return if the mother bird would call, so we confined her alone in a small cage inside the bird house, the outer door of which was left ajar. In doing this we necessarily provided conditions which would test the bird's intelligence. The open door extended to the wall of the house and barred the entrance from one side. As we had anticipated, Donna called promptly and in a few minutes the young bird emerged from the tangled vines and approached its home, but from the side that was barred by the open door. We watched the experiment with interest because some naturalists have accused the valley quail of stupidity. After several futile efforts to enter from this side the bird walked completely around the house and entered the open door, showing that even if his success was due to chance, he at least possessed enough intelligence to make an attempt to approach the door from more than one direction.

All the young birds were males. (Continuing on page 528)



The Civilian Conservation Corps Carries On!

Undaunted by the Rigors of Winter, 200,000 Young Men Re-Enroll,
Reinforced by 100,000 Recruits. Their Accomplishments for the First
Six Months Reviewed

By FREEMAN C. BISHOP

THE Civilian Conservation Corps carries on!

Their way paved by President Roosevelt's proclamation extending the emergency conservation work, more than 200,000 enrolled members on October 1 "signed up" for another six-month period. During the month their ranks will be brought up to full strength by the enrollment of 100,000 recruits, replacements for those who have found other work, for those who have been discharged, and for those who failed to re-enroll for reasons of their own.

The new conservation army will face the rigors of winter—but not unprepared. Many of the camps will be moved to the warmer climates of the South, while those remaining in the colder zones will be relocated in permanent buildings, one of the largest lumber orders in recent years having recently been placed for their construction. The men will be warmly clothed and equipped.

Given the opportunity to remain in the forest for an additional six months, members of the Corps had their own ideas about taking advantage of it. In one camp, when members were asked to step forward if they planned to re-enroll, there

was not a man who did not unhesitatingly respond. In another camp more than fifty per cent signified their intention to leave.

"Yeah, I'm goin' on leave," one curly headed youngster said. A week later he limped into camp. He was dirty. His eyes were bright. He was drooping with fatigue. But he was shouting greetings to everyone in sight.

"I walked thirty miles since yesterday noon," he confessed. "And it was plenty tough. M'uh folks? Oh, they're fine. They says to come on back, but they didn't need to tell me that." He entered his hut, took one long look at a canvas cot, and rolled on it, kicking his legs in the air. "Re-enroll? Just try and keep me out!"

But another: "Stay in this dump another six months? Say, do you think I'm nuts. I wouldn't stay here for no man. Not me, brother, I'm pushin' off."

A serious, black-headed boy, not a week past nineteen, thought it over. "Well, I don't know if I can stay. You see, I got a lot of obligations. My mama, she ain't been so well, and my sister, she don't stay home all the time. So

you can't tell whether I'll re-enroll or not. It just depends on my folks, if they need me or the dough. Like it here? Sure, why not? I've seen a lot worse."

Enrollment of new recruits is planned to give relief for the thousands of young men who are still wanderers of the road.

Accomplishments? Many Army and forestry officials, at one time secretly skeptical of the actual benefit to be acquired from the C. C. C. work, have slowly arrived at new conclusions. Many believe, now, that the forest work will do what the early advocates claimed for it; that it will pay good dividends in increased public wealth generations to come.

In one district a road was put through after great hazard to men and equipment. It clung to the face of a sheer cliff. A false step and you were precipitated into a raging, mountain stream. The road was four miles long. Before it was made passable it had been necessary to travel thirty-seven miles in order to arrive at the same point four miles now reached.

Fire breaks, telephone lines, timber stand improvement, and the myriad minor tasks of the Corps have contributed to the ease and wealth of the United States. In many sections it is possible only now, after hundreds of years of occupation, for mountaineers to come and go from their homes within the span of daybreak and sunset.

The personal benefit of the first six months is to a degree astonishing. Wan and pale; weak and thin; sniveling and unknown; tough with the city toughness, thousands of these young men came into the mountains. They have lost their paleness; they are strong with the strength of body and mind; they are afraid of nothing.

Character building, too, has been an important and far more influential part of their lives in the camps, although it has not been so evident since it is the custom of young men to conceal any inner changes from what they fear may be the eyes of ridicule.

The men have developed a self reliance. They have developed a pride in self and in their ability to earn and to aid others with what they earn.

Mountain peaks, long lonely evenings, and the searching silences of the night have lent a depth to their lives, which never would have been present if they had not enrolled. Many authorities agree that one of the greatest beneficial results of the camps will be the establishment of a finer manhood among its members.

"In the event of any national emergency these men of the C. C. C. would constitute a body of men, who could be quickly trained and efficient far beyond the average," one well known Army official stated during the past few weeks.

Army and forestry officials are faced with many problems in governing the members and getting them to work. It is difficult for the boys to remember that they should obey orders. They are often slow and lagging when formations are called for checking men to work or checking their property. But eventually they arrive at the designated point.

When a member of the corps loses any of Uncle Sam's property, which has been entrusted to his use while an enrollee, he is charged with the property and the price is deducted from his pay. This has been a bone of contention between officers and members since the first property check in camps revealed missing clothing and equipment.

Called on to perform some task distasteful to them, there have been members of the Corps who have openly defied officers. The result was questionable. They could be fined a maximum of three dollars for bad behavior. They could be discharged from the camp for insubordination. The first penalty seemed too much mixed up with a man's pay to

be fully effective. Resentment and open radicalism was and did develop in some camps from such discipline. The latter penalty seemed too severe. However, an officer had no other alternative. There are no forms of discipline in a forest camp, other than turning a member over to civil authorities. It has been a recurring problem for administrative officers.

Every day there is something new in administering a camp. Some of the problems are petty and easily solved. Some of them are of considerable standing in the eyes of the members and must be treated delicately lest the lid of agitation be released. The officers use strategy. They ease along each new problem, nursing it, and sighing softly as they see it diminish in size.

"Don't lose him, don't lose him," one C. C. C. cried bitterly as the ace pitcher for the camp team seemed about to walk a man on a team composed of ball-players from the nearest village. It was a good game. Seventy-five per cent of the camp personnel attended. It was Saturday afternoon. They relaxed. They enjoyed yelling and whooping. Keen rivalry was built up among teams from various camps, while using the village teams as bludgeons for their most carefree spirits.

Horse-shoe pitching, volley ball, football, swimming, and inter-company competition in these sports as well as individual matches are daily relaxations for the members of the camps. They have long evenings as the sun glitters softly, falling slowly behind mountain peaks.

Reading and writing compose many evenings' entertainment. The members are supplied with many magazines, and permanent and travelling libraries, filled with a strange mass of literature. Louis Bromfield nudges shoulders with *Dick of the Diamond U*. However, the very complexity of the libraries serves as a spice to the members, many of whom read books they never before knew existed.

Recreation is not plentiful in the mountain camps, but it is sufficient, and it keeps everyone busy. There are occasional movies of forest work. Plans of the War Department this winter call for traveling movies to be shown weekly at the camps in each area.

Trucks are used to convey the members to country fairs, and often on Saturday nights to the nearest hamlets where the men attend the square dances, listening with glistening eyes to a fiddler and banjo player, playing for long periods without a halt.

Half hour classes are held each evening in many forest camps. The classes consist of reading, writing, arithmetic, bookkeeping, geography, history, foreign languages, and many vocational trades.

In some camps illiteracy was common. It was necessary that these men learn to write and read. Many of them were shy and ashamed of their inability but once plunged into the stream of learning they took their studying seriously. Many men plan to study during the winter.

Classes are conducted by foresters, Army officers, and, in many cases, by C. C. C. members with college educations.

It is not uncommon for members of the camps to spend the week-ends with friends, whom they have made since moving into the mountain regions. These "friends" are mountaineers, inhabitants of the small villages, and city dwellers on vacation. The boys from the camps have met the residents. They have become friendly and after a few months they are almost like members of the family.

During the early days, the rougher members of every camp made themselves such clear-cut hoodlums that many of the residents near camps would have nothing to do with any member. However, as months passed, time wore away this resentment, and the boys are welcomed in many homes.

General relations of camps with the communities in which they are located are said by officers to be excellent, though strained at times by some wild hoodlum. However, the weeding out of this undesirable element has been accomplished with an effective trowel. Like weeds, they have been of no benefit, and they have been discarded, lest they choke their more promising and progressive neighbors.

Romance, also, has raised its many-hued presence in the Corps of forestry workers. Months of living strange, oddly different lives have instilled in many members a new conception of the values of human relations. Dan Cupid has found ready targets for his numerous shafts. Marriages already have been recorded in many forest retreats, and the men, who were boys, are settling in the far reaches of the far flung ranges, covered now with a resplendent jacket, reflecting the myriad changes of late fall. Contentment has come to many of these young men for the first time in their too often twisted lives.

The arrangements necessary for contacting feminine companionship in the mountains is unique. Members wander into tiny villages. They relax indolently against a light pole, legs braced, or grace a much-whittled country store bench. Many evenings they sit, broodingly unhappy for their intimate contacts at home. Weeks pass. Some members put forth too bold a front in meeting the country sweethearts; others are too shy; while the majority strike the half-bashful attitude common to all young men. Often they hit themselves gleefully on bended knees when a bevy of particularly attractive girls, arms akimbo and entwined about each other, wanders down the street, blissfully aware of the sensation their mere presence creates.

One day someone says something. Perhaps a girl sits down near a C. C. C. Perhaps he takes a seat near her in the movies. At any event the process is slow, but mightily

sure. One evening they walk to the school house and back. Another evening they make the same trek, returning even later. They talk. They giggle. Perhaps they attend the theater. It is an event.

Marriages are few, but illuminating when the couples are questioned.

He was a scant twenty-four years. She was a youngster

of barely twenty. Both had seen many difficult years. He and his brother supported a widowed mother. His brother was doing better, now, he said. His mother didn't need the money, so he decided to "take a chance." She had been the offspring of mis-mated parents. She was shy. In the mountains divorce is considered little short of adultery. She worked by the day, washing the finer linens and silks for the wealthier families. Occasionally she secured off bits of sewing.

They met one evening at a barn dance. They had counted five in the circle and suddenly were face to face. They said nothing, no words passed as they danced, parted and counted five.

Three days later she came into a small restaurant. He was there, proud of his uniform, proud of his manhood.

A week later and they danced again. She was flaming with color as they circled the floor. He was stammeringly happy. They talked tonight. It was a month later. They sat, one Sunday afternoon, high on a pinnacle of rock. They were talking of how lonely must be the life of a fire "look-out" as they stared at a fire tower with its shining windows twinkling in the late sunshine, cock-eyed now with the turn of the earth at the change of seasons.

A week later he announced that he was to be married. "Yeah, married," he said. The wedding was quiet. They had only a few dollars for the minister. They had paid a month's rent—six dollars for two tiny rooms. It was plenty, they said, for a while anyhow. (Continuing on page 524)

Of the 300,000 young men and war veterans enrolled in the Civilian Conservation Corps, approximately 200,000 have re-enrolled for the additional six-month period ordered by President Roosevelt. The 100,000 who left to take other jobs or who were discharged at the expiration of the first term on September 30, will be replaced by new recruits, bringing the Corps to its maximum strength by November 1. The 14,400 Indians now enrolled on the Indian Reservations will continue with few replacements.

Throughout the winter 1,466 work camps will be operated, at least one or more in each of the forty-eight states. Practically all of the camps will be reconstructed for the cold weather period.

To reconstruct these winter camps the Federal Government has placed orders for 250,000,000 board feet of lumber, the largest single order ever placed for lumber in the history of the country. The camps will be ready for occupancy by November 1.

For the new six-month period more than 4,000 experienced woodsmen and foremen will be employed, to fill vacancies and to supervise new work, bringing the total of men so employed up to 25,000.

Although work reports for the first six months have not been tabulated for the entire country, local reports give some indication of the accomplishments of the Corps. In California, where 167 camps were located, forest fire damage on the National Forests was reduced forty-two per cent, only 54,507 acres being burned over, in comparison with a five-year average of 111,000 acres. At the same time the cost of fire fighting was reduced from \$280,000—a five-year average—to \$38,600, or a reduction of eighty-five per cent.

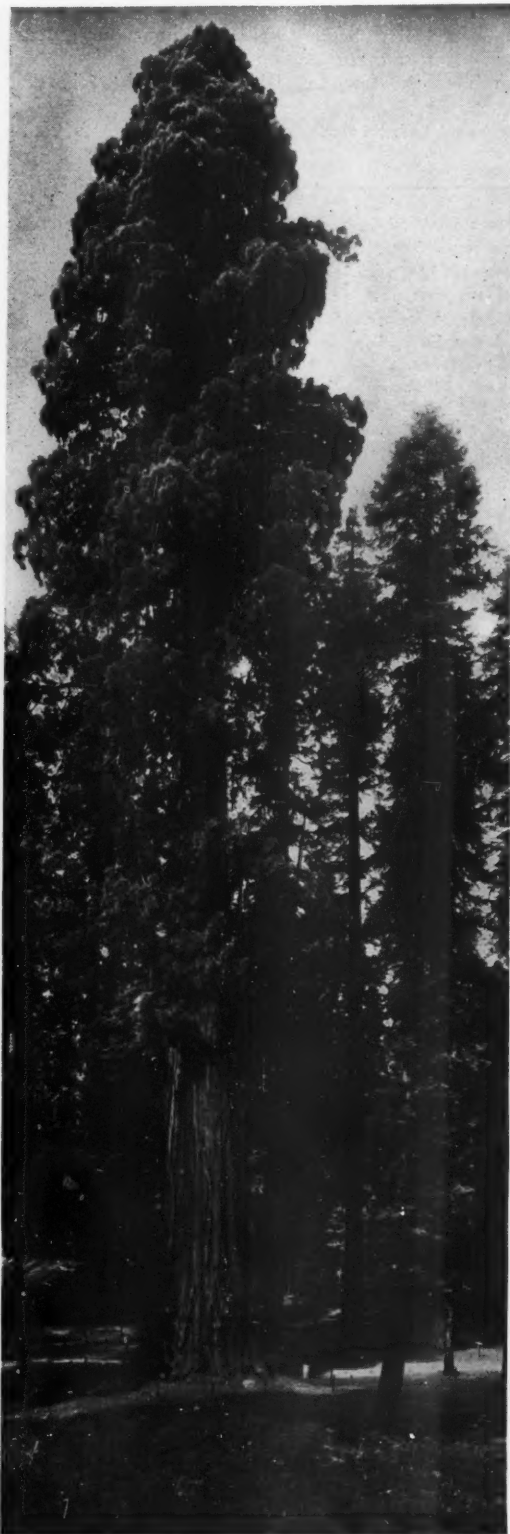
This reduction was incidental to the construction during July and August, of 621 miles of forest roads, 1,010 miles of truck trails, 1,054 miles of telephone lines, and 374 miles of firebreaks. In addition, the men covered 185,169 acres in rodent control, 41,972 acres in insect control, and reduced fire hazards on 700 miles of roads and trails.

In the Oregon forests the Corps, up to September 1, had constructed 736 miles of mountain fire prevention roads and truck trails, and had improved 3,148 miles of existing roads. It constructed 455 miles of telephone lines, while 1,440 miles were maintained. Nearly 300 permanent forest buildings were put up, including lookout houses and ranger stations. In addition, the Corps took an active part in fire-fighting, especially in the disastrous Tillamook fire.

The cost of enrolling and maintaining the Corps throughout the country for the first six-month period is estimated at \$125,000,000. Practically every community in the United States was benefited by this expenditure.

BIG TREE

Sequoia gigantea, Decaisne



By Georges Moulin

A Big Tree, over a thousand years old, lifts its rounded crown above a massive trunk, and shows its size in contrast to neighboring pines and firs.

THE BIG TREE, the oldest and most massive of all living things, links our civilization with the dim records of the past. John Muir called it "king of all the conifers of the world, 'the noblest of a noble race.'" Flourishing trees now standing in the California groves were swaying in the Sierra winds when Christ walked the earth. These trees of the Sequoia group are remnants of an ancient race which flourished as far north as the Arctic Zone during Tertiary and Cretaceous times. All but two species—the Big Tree, *Sequoia gigantea*, and the Redwood, *Sequoia sempervirens*, have disappeared since the Glacial Period. These two continue growing in the California coast mountains and western slopes of the Sierra Nevada, at elevations of 4,000 to 8,500 feet above sea level. The older trees grow on high land from which the glacial ice apparently melted long before it did in the intervening canyons. Here the snow gathers six feet deep for three to six months each year, and the temperature may drop below zero. In contrast to the Redwood, the Big Tree grows at higher elevations and cooler sites farther back from the coast, and out of the fog belt. They are found in some seventy groves of five to 1,000 trees in an area extending from the North Grove, east to Lake Tahoe in the Tahoe National Forest, southward for 260 miles to the Deer Creek Grove, east of Porterville in the Sequoia National Forest. The annual precipitation in this area varies from forty-five to sixty inches, much of which is in the form of heavy snowfall.

The nearest relative of the Sequoia on this continent is the bald cypress, *Taxodium distichum*, of the Southern States, but the name of these Westerners perpetuates that of Sequoyah, otherwise George Guess of Georgia, a talented Cherokee Indian Chieftain, who, between 1770 and 1843, invented the Cherokee alphabet.

The Big Tree thrives in shallow grassy basins where the soil is deep and sandy to gravelly, and in draws near the headwaters of streams where soil moisture is abundant. While occasional pure stands of Big Trees are found, they usually tower among a forest of sugar pine, incense cedar, white fir, Douglas fir, or Ponderosa pine. The trunk may rise eighty to 225 feet before the first limb, and be surrounded by a crown rounded at the summit, or much broken, depending upon the age of the tree. The trunk of young trees is clothed to the ground with slender up-curved branches, and is highly ornamental.

Trees attain heights of 300 to 330 feet, and one in the Calaveras Grove is estimated to have once been 400 feet high. This grove of about one hundred trees was first reported in 1841. Ten feet from the ground and above the stump-swell trees may be twenty-seven to thirty feet in diameter, but more frequently they are twelve to seventeen feet in diameter, 200 to 280 feet high, and from 1,200 to 2,000 years old. The stump of one tree recorded 3,400 rings of annual growth, and John Muir counted the rings on another which he believed to be over 4,000 years old.

The Big Tree has bright, deep green foliage in the form of scale-like, sharp-pointed leaves closely overlapping one another on the branches, after the manner of cedars. They are "evergreen" and remain on the branches three to four years.

Tiny flowers of both sexes, borne singly at the tips of different twigs on the same tree, appear in February and March, when snow is on the ground. The pollen-bearing flowers are about a quarter of an inch long, scaly, and in large numbers over the tree. Clouds of pollen from these

fertilize the small, pale green seed-producing flowers, which mature in two seasons into woody, yellowish brown, egg shaped cones varying from two to three inches long. Under each thick cone scale are five to seven brown, flat, wing margined seeds with a kernel about the size of a pin head. The seeds are released in the late autumn, when the wind carries them relatively short distances from the parent tree, but the empty cones may remain on the tree. Unlike the Redwood, the Big Tree does not produce sprouts, but depends entirely upon seeds for reproduction.

The red-brown bark is twelve to twenty-four inches thick, soft and in two layers. The outer is composed of fibrous scales, while the inner is thin, close and firm. Vertical breaks extending the length of the trunk give it a fluted appearance.

The heartwood is dull purplish red-brown, lighter and more brittle than that of Redwood. The straight grain varies from very fine in the later growth of old trees to coarse in the wood produced during the first 400 to 500 years while the tree growth is rapid. When freshly cut, Big Tree wood is brilliant rose purple red. The sapwood is thin and nearly white. The wood contains much tannin. Like Redwood, its uses are various but the loss in felling is so great, the logs so difficult to handle and the wood so brittle that it is now practically off the market.

With the rosy purple drops of Big Tree sap, John Muir wrote letters, and reported that the Indians drank it in the hope of gaining some mystical power.

The most imposing Big Trees are within the General Grant National Park and the Sequoia National Park. Between the Kings River and the Kerns River are many trees twenty-five feet in diameter containing upwards of 500,000 board feet, and probably 3,000 years old. The larger of these trees probably weighs over a thousand tons.

The Big Tree owes its long life in no small measure to its freedom from destructive fungus and insect enemies. This may be due to the high tannin content of the wood, and also because there are no pitch tubes, as in the case of the pines, through which fungi may progress through the wood. Most destructive are the results of fire or other more or less natural causes which undermine the roots, causing the tree to settle and tip over. Occasionally, also, huge limbs may grow so as to over-balance the tree.

Big Tree seeds germinate best on bare exposed soil in sunny places and in spite of the small amount of stored food within the seed, seedlings are fairly common in favorable places. The seedlings will not grow naturally in the dense shade of the forest where thick layers of litter cause plants to die before becoming rooted in soil. Favorable conditions for natural reproduction frequently follow fires, floods, or where the ground has been disturbed by logging or road building operations. While ground fires help prepare the soil for seedlings to start, subsequent fires are disastrous to the young trees.

Seedlings are successfully grown in nurseries and can be transplanted. Big Tree has been extensively planted in California, and will grow in parts of the eastern United States, and also does well on the British Isles and in Central Europe.



By Woodbridge Metcalf

Sharp pointed, scale-like evergreen leaves overlap one another as with the cedars, while the dull yellow brown cones are two to three inches long.

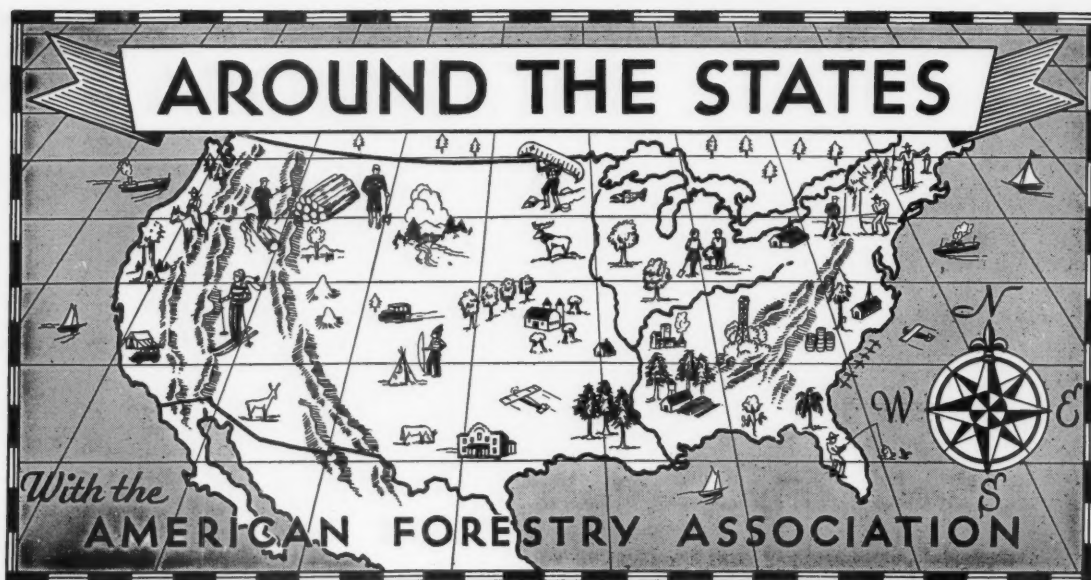


The natural range of *Sequoia gigantea* is confined to a small area in California.



National Park Service

Deep fissures in the thick red-brown bark give the Big Tree trunk a fluted appearance.



Fire Toll in National Forests Held to New Low Level

That an all-time low record in fire losses will be hung up in the National Forests this year is indicated by Forest Service reports received for 1933 up to the last week of September. The reports show a decrease of nearly sixty per cent in burned area as compared with the same period last year.

The number of fires was eight per cent less than for the corresponding period of 1932, and compared to the average annual figures for the five-year period of 1925 to 1929, the showing is still better. Encouraging, also, is the decrease in number of man-caused fires. Forest Service reports compiled from all regions show that the man-caused fires in the National Forests for 1933 up to September 20, number 2,951, against 3,374 for the same period in 1932, and a five-year annual average of 3,453. The area burned over so far is 128,635 acres compared to the five-year average of 600,873 acres per year. This is the lowest area burned over for the period since 1906, and in terms of percentage of total National Forest area, it is the lowest on record.

Reports from all regions indicate forest fire control conditions generally favorable, with some remaining danger spots in the Ozark section and in restricted areas of the West. Unless unforeseen dangerous weather conditions arise, the worst of the forest fire losses should be about over, according to Roy Headley, assistant forester and chief of operations. In addition to favorable weather conditions, Mr. Headley attributes much of the success in meeting the fire emergencies this year and in keeping down the cost of fire suppression to the presence of hundreds of Emergency Conservation camps in the National Forests on forest improvement jobs. The C. C. C. men have in most cases responded quickly and energetically to the calls to fight fires. New truck trails,

horse trails, and telephone lines constructed by them have improved the opportunities to get men and equipment to fires before the flames had gained great headway.

Costs of fire suppression in the National Forests this year up to September 20, amounted to \$257,199, as against \$706,112 in 1932, and \$3,922,217 in 1931. Damage to commercial

sion costs combined totalled \$7,000,000 to \$8,000,000 annually.

Largest acreage losses this year have occurred in the National Forests of the California, Lake States, and Intermountain regions. Practically half of the National Forest acreage burned over this year was in California.

TWENTY-NINE DIE IN CALIFORNIA FIRE

Twenty-nine forest fire fighters, trapped in a canyon above Hollywood, California, were burned to death on October 3. More than a hundred were injured, many seriously. The victims were part of an army of relief workers recently employed on a municipal project in Griffith Park, a woodland playground.

Two hundred men were in the canyon when it became encircled by the flames. Only the first to flee were able to escape, the others dropping one by one as they attempted to fight their way through clouds of smoke.

According to survivors, the relief workers, part of 3,700 brought out from Los Angeles and Hollywood, were sent into the canyon to construct fire breaks after the fire had gained headway. A sudden gust of wind spread the flames around the canyon, trapping them.

When the first news of the tragedy was flashed out, a fleet of ambulances and all available fire companies from Hollywood were rushed to the scene, together with a crew of fire fighters which numbered 2,000 men before the blaze was finally brought under control. The fire, believed to have started from a cigarette cast aside by one of the workers, burned over about 1,000 acres.

W. R. Woods, one of the survivors, in a statement given the Associated Press, said: "We dug and worked to make a fire break, when suddenly the flames were upon us. I ran with a few others and got around the fire. When I looked back I saw many of the others running up hill. They kept dropping. Then they would crawl a little way and lie still, apparently suffocated. I never heard a scream. They died silently."

At the time of going to press a board of inquiry was being created to investigate the tragedy, one of the most disastrous in years.

timber and tangible property amounted to \$120,437, against \$294,164 in 1932. Neither 1932 nor 1933 is classed as a "bad" year by the Forest Service. In 1910 the combined costs and damage passed \$27,000,000, and in 1919, 1926, 1929 and 1931, fire damage and suppres-

of action to be followed by the board was considered. The board discussed the possibilities of a unified Mississippi development, including flood control, power, navigation, reforestation and soil erosion, with special reference to proposals which have been submitted

Graves Appointed Member of Mississippi Drainage Board

Henry S. Graves, Dean of the Yale Forest School, and formerly Chief of the United States Forest Service, has been named a member of the Mississippi Drainage Area Board which has just been created by Federal Administrator of Public Works, Harold L. Ickes. The purpose of the new board is to correlate and coordinate the various projects looking to the control and development of the Mississippi River and its tributaries.

Other members of the board are Charles H. Paul, of Dayton, Ohio, formerly connected with the Massachusetts State Board of Health, the Metropolitan Waterworks of Boston, the Philadelphia Bureau of Filtration, and the United States Reclamation Service; Herbert S. Crocker, a public works and bridge engineer of Denver, Colorado; Professor Samuel L. Woodward, of the School of Engineering of the University of Iowa; Professor Harlan H. Barrows, Chairman of the Department of Geography, University of Chicago; and Major-General Lytle Brown, Chief of the Engineer's Office of the Army.

The initial meeting of the new board was held in Washington, October 2 to 5. Mr. Paul was elected chairman, and a program

for the improvement of the Tri-State Area of the Pittsburgh Region, the Muskingum River Basin in Ohio, and the Red River Basin of Arkansas, Oklahoma, Texas and Louisiana. It is understood that the board will advise in regard to the expenditure of the \$44,120,000 allocated from Public Works funds for expenditure on the lower Mississippi River and the \$33,500,000 for work on the upper Mississippi, together with \$14,153,000 for improvement work on the Missouri River.

20,000,000 Locust Trees Ready for Erosion Control in Mississippi

Twenty million young black locust seedlings have been grown this season and are available for erosion control planting by Emergency Conservation Work camps in northern Mississippi. In a few weeks these seedling trees will become dormant and ready for fall or spring planting, according to reports received by the United States Forest Service. The lands to be planted were formerly tilled fields, now gullied and the source of floods which destroy more upland and inundate rich delta country.

According to J. B. Snider, president of the North Mississippi Reforestation and Flood Control Association, the two-fold work of reforestation and flood control being accomplished in the northern end of the Tallahatchie Basin in Mississippi is already showing its value.

"The interest of the people in the hill section where this work is being done and where erosion is being stopped, and grass and trees are being planted on eroded land, is surprisingly great," he said. "A movement has been started in that section to ask our legislature to pass laws which will make compulsory the future maintenance of this work being done by the Federal Government."

Recreational Possibilities of Superior-Quetico Region Emphasized

Canadian public officials joined with Secretary Henry A. Wallace of the United States Department of Agriculture and others in urging against a general program of damming lakes and streams in Northern Minnesota, during hearings before the International Joint Commission in Winnipeg, October 5 to 7, and in Minneapolis beginning on October 9. Supporting the position of the Department of Agriculture as established in the Superior National Forest Secretary Wallace stated in a letter submitted by Ernest C. Oberholtzer, president of the Quetico Superior Council, that preservation will be the major objective in the administration of the National Forest. This will not necessarily exclude industrial uses but their control and coordination will be undertaken.

Chairman A. O. Stanley, of the American section of the International Joint Commission, as reported in Minneapolis papers, speaking personally, and not as a member of the Commission, said, "I am heartily in favor of establishing an international forest area in this marvelous country in the watershed, the last and finest of our natural beauty spots. I think this region is ideally suited to development and safeguarding of a great recreational area."

Supporting the principles of the Shipstead-Nolan Act and referring to the established position of the Department of Agriculture, Secretary Wallace stated, "A policy under which the territory would be preserved largely in an unmodified condition, so that the large populations tributary to it can depend upon it as a field for many beneficial forms of outdoor recreation, impresses me as sound and I have no intention of departing from that policy."

The International Joint Commission has the statements of the two governments, the E. W. Backus interests, now in receivership, and conservation groups under consideration and hopes to make an early report.

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C.C.C. Forestry Work Not Detrimental to Wild Life

Forest Improvement Work, which is being done by many of the Civilian Conservation Corps camps in the southern Appalachians, has caused alarm on the part of a number of local people interested in wild life lest the thinning of berry and nut trees will deplete the food supply of birds and game. Several complaints to this effect have been received by the Forest Service and Joseph C. Kircher, Regional Forester, has taken steps to correct the misconception. In answer to one of these complaints Mr. Kircher recently wrote:

"One of the projects being undertaken from the Civilian Conservation camps is placing the timber stands on the National Forests in better growing condition. Most of the lands acquired for National Forest purposes in the East have been cut over by former owners and have come to the Government in a run down or wrecked condition. In many of these stands all of the merchantable timber has been cut and the large trees remaining are either defective or of species which are of little value for lumber. It is in such stands that the men from some of the Civilian Conservation camps, working under trained and experienced foresters, are cutting out the weed trees and those individuals not fit for future lumber production in order that these stands may become as productive as possible. The work consists chiefly of girdling the large defective trees which will never have any value, of thinning out some of the dense young stands, and of releasing trees of the more valuable species in order that they may show increased growth. This work is being done only on the good sites, that is, those areas where the soil is capable of producing satisfactory growth and only on those portions of the good sites where the stand shows need of the treatment outlined.

"It is true, of course, that the removal of any tree, shrub, or vine capable of producing fruit eaten by game birds or animals reduces temporarily the total supply of food in the forest. It should be understood, however, that the area treated constitutes a very small part, probably not over ten or fifteen per cent, of the entire area within a given National Forest, and that in no case are all of the food bearing trees and vines removed from any area. It is strongly believed that available food is not the chief factor limiting the supply of game in the southern mountains. In support of this belief, the deer population in the Pisgah game preserve in North Carolina has multiplied many-fold, although this area has been subject to the usual activities which are found on any National Forest, including a large timber sale which has cut over the majority of the area.

"Wild life is recognized as one of the valuable resources of the National Forests and considerable time and effort are being spent in its development. It would be quite inconsistent, therefore, for the Forest Service to take any action which would materially affect the available food for game. I am sure you can readily realize that in managing our forests many conflicting interests are met.

"Although it is felt that the stand improvement work being accomplished by the Civilian Conservation Corps has not materially affected the food supply of game, the Biological Survey has been asked to assign a man trained in game management to study this problem. Major E. A. Goldman of the Survey is now engaged in this effort. It is expected that the results of his study will be available in the relatively near future."

Big Game Holding Its Own In National Forests

Big game is more than holding its own in the National Forests, according to the Forest Service. The annual game "census," based on estimates for the year 1932, gives a total for the 148 National Forests of 1,163,142 big game animals. Although this figure was slightly lower than the total for 1931 of 1,175,955, game animals on the National Forests are estimated to have increased forty per cent since 1926.

The greater part of the big game in the Western States is to be found in the National Forests. According to the Forest Service, seventy-five per cent of the total western big game range lies within the National Forests. Deer in 1932 decreased from 969,330 in 1931 to 946,546, carrying with this decline the slight decrease in the total of all big game. Forage conditions and more intensive hunting are believed to have temporarily halted the increase in deer. Antelope, brown and black bears, elk, and moose, under game and forest management have shown consistent gains for two years.

Grizzly bears, including the big Alaska brown bear, are estimated at 5,164, against 3,747 in the National Forests the preceding year. Excluding Alaska, however, the grizzlies have dwindled in number from 747 to 664. They have so decreased in the West that in several states extinction of the species seems near. National Forests in Montana lead with 421.

Black and brown bears, the playboys of the forests, have increased from 50,596 to 52,331. There are 9,961 in California National Forests, around 5,000 to 8,000 each in Washington, Oregon, Montana, Idaho and Alaska, and 1,500 to 2,900 each in Colorado, Minnesota and Wyoming. The White Mountain Forest

in New Hampshire claims 780. Florida National Forests show heavy gains with 255, Pennsylvania heavy losses with 125 bears remaining in the Alleghany National Forest. North Carolina Forests have 310, Virginia 495, West Virginia about 300.

Elk are gaining in the National Forests of the West, but only about sixty remain in the forests of the East. Altogether the Forest Service accounts for 103,856 of them, against 96,905 in 1931. Moose are holding their own, with 7,854 head, chiefly in Minnesota, Oregon, Washington, Montana and Wyoming. Nearly half of the 21,736 mountain goats range in Alaska with numbers also in Washington, Montana, and Idaho Forests. Mountain sheep are most numerous in the National Forests of Colorado, Wyoming, Montana, Idaho and Alaska, in order given, and number altogether about 12,500.

Deer, interesting vast numbers of hunters, have had particular attention in Forest Service game management plans. Removals have been made from several over-stocked areas. Several hundred were removed from the Pisgah National Forest in North Carolina last winter by regulated hunting. In other National Forests restocking is encouraged. California National Forests still lead with 278,660 head. In New Mexico, a rapid gain last year brought the deer population above 100,000. Oregon and Arizona Forests have over 80,000 each, and Utah, Idaho, Montana, and Alaska Forests over 50,000 each. The Lake States National Forests now have 23,595 deer, showing tremendous gains in two years. In the Eastern and Southern States there are 30,000, the bulk of them in Pennsylvania, North Carolina, New Hampshire, Arkansas, and Florida National Forests.

Conference Held to Frame Conservation Practice Under NRA

Fifty representatives of the forest industries, the Government and conservation organizations met in Washington, October 24, to consider and formulate a program of conservation practice as called for by Article X of the lumber code. The conference was called by Secretary Wallace at the request of the lumber industry. Secretary Wallace acted as chairman and Henry S. Graves as vice-chairman of the meeting.

Another conference is planned for December, by which time it is expected a definite program will have been formulated for final adoption. Among the subjects listed for discussion at the October 24 conference were forest protection, practicability of selective logging, forest credits, forest taxation, forest research, and public land acquisition. The question of farmers' woodlots and measures required to bring their treatment in line with the lumber code also came up for consideration.

Although woodlot owners, turpentine operators, and pulp and paper producers are not grouped under the lumber industry code, an effort will be made to formulate standards of practice that will apply to all woods operations. To this end representatives from each of these groups were invited to attend the conference. Special interest was centered in the attitude of the pulp and paper industry, which thus far has not shown any interest or leadership in including conservation in its code. As a matter of fact, the pulp and paper code, as submitted by the industry, contained no reference to conservation nor provisions relating to woods work, wages, or practice.

It is pointed out that an impossible situation would be created if the pulpwood industry is not subject to conservation practice the same as the lumber industry inasmuch as unfair competition would result in respect to woods labor, hours of work, wages, etc. In addition, some operators manufacture both lumber and pulp in connection with one operation, utilizing the large sections of the trees for lumber and the smaller diameters for pulp. Absence of a code practice for the small timber comparable to that applying to large timber, it is held, will in many instances nullify conservation effort under the lumber industry code.

Organizations and representatives taking part in the conference included:

Lumber Industry: C. C. Sheppard, Clarks, Louisiana; John W. Blodgett, Grand Rapids, Michigan; John D. Tennant, Longview, Washington; F. E. Weyerhaeuser, St. Paul, Minnesota; B. W. Larkin, McCloud, California; G. B. McLeod, San Francisco, California; J. W. Watzek, Chicago, Illinois; R. A. Colgan, San Francisco, California; L. O. Crosby, Picayune, Mississippi; C. R. Johnson, San Francisco, California; C. L. Billings, Lewiston, Idaho;

J. G. McNary, McNary, Arizona; A. G. Goodyear, Bogalusa, Louisiana; Wilson Compton, Washington, D. C.; W. B. Greeley, Seattle, Washington; John E. Johnston, New York City; Henry E. Hardtner, Urania, Louisiana; J. L. Camp, Franklin, Virginia; John M. Bush, Negaunee, Michigan; Arthur Bruce, Memphis, Tennessee; Rex Black, San Francisco, California; C. S. Jewett, Lewiston, Idaho; David T. Mason, Portland, Oregon; Thomas H. Swan, Oshkosh, Wisconsin; William L. Hall, Little Rock, Arkansas; E. T. Allen, Portland, Oregon; A. B. Recknagel, Ithaca, New York.

Forest Service: R. Y. Stuart, Chief, Washington, D. C.; Raphael Zon, St. Paul, Minnesota; E. I. Kotok, Berkeley, California; S. B. Show, San Francisco, California; Burt Kirkland, Washington, D. C.; R. E. Marsh, Washington, D. C.; Fred Morrell, Washington, D. C.; E. E. Carter, Washington, D. C.; L. F. Kneipp, Washington, D. C.; C. P. Winslow, Madison, Wisconsin; Earle H. Clapp, Washington, D. C.; T. T. Munger, Washington, D. C.

The American Forestry Association: Ovid Butler, Executive Secretary, Washington, D. C.; Samuel T. Dana, Ann Arbor, Michigan; G. H. Collingwood, Washington, D. C.; R. B. Goodman, Marinette, Wisconsin; Colonel Joseph Hyde Pratt, Chapel Hill, North Carolina; Philip W. Ayres, Littleton, New Hampshire.

Naval Stores Industry: C. F. Speh, Jacksonville, Florida; R. E. Benedict, Brunswick, Georgia.

National Grange: L. J. Taber, Master, Columbus, Ohio; Fred Brenckman, Washington, D. C.

American Farm Bureau Federation: Edward A. O'Neal, 3d, Chicago, Illinois; Chester A. Gray, Washington, D. C.

Farmers' Educational and Cooperative Union: John A. Simpson, Oklahoma City, Oklahoma.

State Extension Foresters: R. W. Graeber, Raleigh, North Carolina.

United States Chamber of Commerce: W. DuB. Brookings, Washington, D. C.

Pack Foundation: Arthur Newton Pack, Princeton, New Jersey; Tom Gill, Washington, D. C.

Pulp and Paper: S. B. Copeland, Bangor, Maine; D. C. Everest, Rothschild, Wisconsin; Reuben B. Robertson, Canton, North Carolina.

Society of American Foresters: C. M. Granger, President, Washington, D. C.; Ward Shepard, Washington, D. C.; Franklin W. Reed, Washington, D. C.

Indian Service: Robert Marshall, Director, Washington, D. C.

Association of State Foresters: W. G. Howard, Albany, New York; E. O. Siecke, College Station, Texas; L. F. Cronemiller, Salem, Oregon; G. R. Hogarth, Lansing, Michigan.

National Recovery Administration: E. A. Selfridge, Washington, D. C.

Plant 129,000 Acres in 1932

Forest planting in the continental United States reached a total of 129,250 acres in 1932, according to a United States Forest Service compilation of State reports. Additional planting in Hawaii and Puerto Rico bring a grand total of 131,541 acres.

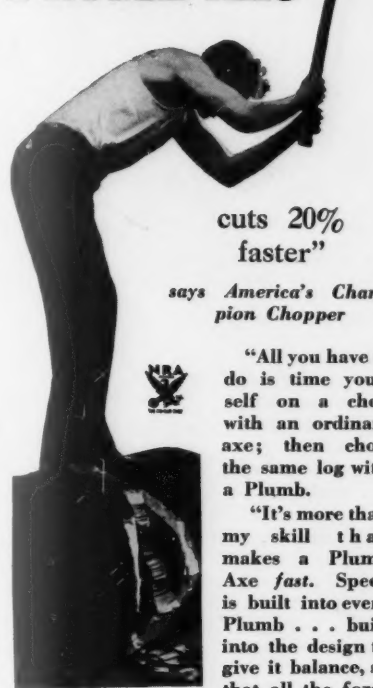
Last year's plantings carry the acreage of all recorded forest plantings up to 1933 to the figure of 2,094,012. Of this area 1,607,979 acres is classed as successful plantations.

Forest Service plantings in the National Forests contributed 24,928 acres of the 1932 plantings. The States planted 53,032 acres; municipalities, 14,900; industrial organizations, 9,021; individuals, 26,811; other organizations, schools and colleges planting 2,849.

Farmers are credited with planting 22,781 acres; lumber companies, 2,076 acres; pulp and paper companies, 2,988 acres; mining companies 752 acres; railroad companies, 49 acres; water and power companies, 1,599 acres.

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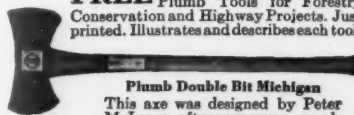
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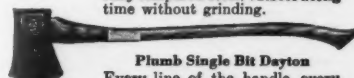
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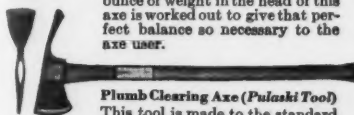
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Photo by Wm. A. Robinson

Public Works Program Includes Many Conservation Projects

Thousands of men are finding employment in the rapidly expanding public works program as applied to forestry and conservation. Early in October more than \$125,000,000 had been allotted to forest improvement projects on National Forests and National Parks, for road building on the National Forests, National Parks, Indian Reservations, and Public Domain, for control of erosion in cooperation with the states, for control of blister rust and other forest diseases, for the work of the Biological Survey, the Bureau of Fisheries, the Geological Survey, and for the development of subsistence homesteads for workers. There are indications that other activities will be added to the list before the close of the present year.

The National Forest Program, which includes the development and improvement of public camp grounds, rapid expansion of the nation-wide forest survey, extensive work in forest research and the building of hundreds of miles of forest highways, roads and trails, has already provided more than 10,000 man-months of employment.

Blister rust control on lands in the National Forests and National Parks as well as those in private ownership where the work is being carried on under cooperative agreement has given employment to 2,000 men in addition to the 10,545 Civilian Conservation Corps workers who are distributed throughout the White Pine area in 227 camps. These men were supervised by over 600 foremen and during the past short field season destroyed gooseberry and currant plants on nearly 400,000 acres of White Pine land, thus making the land safe for White Pine. Weather conditions over much of the White Pine regions of the West as well as the East compelled the closing of most of these camps early in September but the work will be resumed in the spring.

The National Park Service with over \$17,000,000 allotted for the building of roads and trails in the National Parks and over \$3,000,000 for fiscal improvements and buildings has given employment to several hundred men. Much of this will be slowed down during the winter, but will be resumed again early in the spring.

Under the forest acquisition program to which \$20,000,000 has been allotted, the National Forest Reservation Commission has acquired or secured options on nearly 1,000,000 acres of land at an average of \$1.87 per acre. Land surveyors and appraisers are busy throughout the purchase areas in an effort to secure additional lands so that the National Forest Reservation Commission may add be-

tween six million and seven million acres to the eastern national forests during the coming year.

Purchase of lands for the Great Smoky National Park for which \$1,550,000 was allotted has been temporarily held up awaiting an opinion from the Attorney-General to determine if land acquired for Emergency Conservation Work purposes can eventually be turned over to the National Parks.

The National Arboretum in the District of Columbia for which \$171,638.75 of Public Works Funds were allotted remains incomplete. The money was provided to purchase about 190 acres of land necessary to complete Government ownership to a block of about 800 acres. Although the amount secured from Public Works Funds is sufficient to cover the appraised value of these lands, plus twenty-five per cent, thus sum has not proved satisfactory to the owners. There is a possibility that the difference will be bridged by another special appropriation. If this is done, men employed in the Civilian Conservation Corps will be put to work directly on the land for the construction of roads and trails, the laying of water mains, and the erection of necessary greenhouses and administration offices.

The conservation and forest work extends from Alaska where employees of the Forest Service, the National Park Service, the Bureau of Fisheries, and the Biological Survey are all carrying on construction and improvement work through the states and on into Puerto Rico where \$1,500,000 is being spent for reclamation and improvement work. A road building program of \$4,000,000 on the Indian Reservations is giving work to large numbers of Indians, in addition to the 14,400 employed in the Conservation Camps. This is relatively small, however, in relation to the vast areas of the reservations, and may receive additions. The efforts of these several bureaus are being augmented by \$5,000,000 for a nation-wide soil erosion control program and by \$2,400,000 allotted to the Geological Survey with which to complete the topographical surveys of all the states. In Cleveland, Ohio, the Metropolitan Park Board is receiving \$650,000 for the improvement of a large city park.

Under an allotment of \$630,000 to the Bureau of Plant Industry for nurseries in which to grow plants for controlling erosion, men have been studying opportunities in the West and South. Existing nurseries at Mandan, North Dakota, and Woodruff, Oklahoma, may be expanded, while arrangements may be made with commercial nurseries for growing other planting stock.

Civilian Conservation Corps Recruits for New Period

The second enrollment period of the Civilian Conservation Corps, which began October 1, will bring between 75,000 and 100,000 new men into the forest work camps, according to Robert Fechner, director of Emergency Conservation Work. These men, selected from every section of the country, were undergoing physical examinations on October 10, and will be conditioned and ready for the winter camps by November 1.

With the enrollment of the new recruits, who replace those who have been dismissed or who have found employment elsewhere, the Corps will be back to its maximum strength of 314,400—300,000 young men and war veterans and 14,400 Indians. Slightly more than 200,000 men who served through the first period have re-enrolled.

At the same time it was announced that 4,000 men would be employed as supervisors and foremen for the second period, bringing the total serving in this capacity to 25,000.

According to Mr. Fechner, all winter camps have been approved—1,466 in number. Of these 534 have been relocated, moved, in most

cases, to a warmer and more workable climate. All of the camps will be conditioned for the rigors of winter. To do this, and to build the new ones, the Federal Government has placed orders for 250,000,000 feet of lumber, one of the largest single orders ever placed for lumber in the history of the country.

"It is a gigantic construction project," Mr. Fechner said, "reminding one of war conditions. Three hundred thousand men must be provided with shelter before the cold weather sets in. Two hundred and fifty thousand men will live in lumber-built houses and fifty thousand men in tents. The latter group will be located in the southern part of the country where climatic conditions are less severe. Each house built will accommodate fifty men and there will be 200 men in each camp."

Construction of the camps will furnish a market for many other building construction articles as well as electrical and plumbing supplies. Among the items to be purchased in quantity are sheeting material, hardware, piping, cement and roofing materials. All of the camps will have electric lighting.

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Book Reviews

TREES OF NORTH AMERICA, by George Rex Green. Volume I—The Conifers. Published by Edward Brothers, Inc., Ann Arbor, Michigan. 186 pages. Price \$2.00.

In the first volume of "Trees of North America," George Rex Green, of Pennsylvania State College, presents a compilation of detailed information regarding all of the American conifers ranging from the pines and spruces through the cypresses and cedars to the yews and yuccas.

The book is without illustrations and is multigraphed rather than printed. Multigraphing it on one side of the sheet provides alternate blank pages on which notes can be inserted.

While the paper binding presents a temporary appearance, the material gathered from a host of sources presents complete and authentic descriptions of each of the trees together with notes concerning their rate of growth, light requirements, and economic importance. As a reference book, it stands with few competitors.—C. H. C.

NATURECRAFT CREATURES, by J. W. Lippincott and G. J. Roberts, published by J. B. Lippincott Company, Philadelphia. 134 pages; illustrated. Price, \$1.50.

Naturecraft is a form of art that will by all means appeal to young people and will be enjoyed by persons of all ages. All that is required to make the most out of this book is imagination, ability to use the fingers skillfully, and a love for modelling. The authors not only present clearly the necessary processes and implements, but they furnish models, the strangest, funniest, jolliest little creatures one ever saw, from which to work. The idea is simple, involving pine cones or sea shells, making legs of twigs or pipe cleaners, heads or beaks of maple seeds or smaller cones or shell. A simple hobby, but a fascinating one.—E. K.

EYES OF THE WILDERNESS, by Charles G. D. Roberts. Published by the Macmillan Company, New York, 1933. 269 pages. Price \$1.90.

Mr. Roberts' interest in animals goes deeper than a knowledge of their forms, habits and colors, their dwellings and matings. These fundamental facts he understands, of course, but in this collection of stories the author displays an almost uncanny appreciation of what goes on in the minds of the wilderness creatures. He attempts to "get under the skins" of these furred and feathered folk.

With the reading of this book we derive a feeling of sympathy and love for its animal characters that leaves us more responsive than ever to the "call of the wilderness."—M. C.

BASKET PIONEERING, by Osma Palmer Couch. Published by the Orange Judd Company, New York, 1933. 160 pages; illustrated. Price \$1.00 and \$1.25.

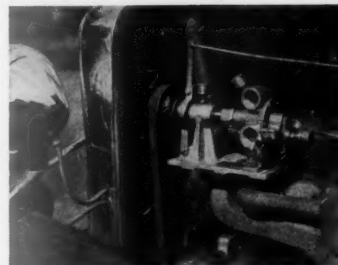
A popular handbook containing concise directions and clear, simple diagrams designed for the beginner as well as the more experienced basket weaver. The book is written so as to develop the vision of the reader, enabling him to recognize the possibilities of common things and to discover the joys in the art of creation. Camp leaders and teachers will find the book a storehouse of valuable and interesting projects.—M. C.

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Cooperators Urge Extension of Nut Tree Program

At a meeting held the first week in October in the offices of The American Forestry Association, representatives of organizations which cooperate with the committee directing the planting of nut seeds and trees from historic grounds expressed enthusiastic approval of the work accomplished and urged the committee to base their plans on the continuance of nut tree conservation for a second five-year period. The question before those in attendance at the meeting was whether the remaining months of the program should be devoted to winding up its affairs or whether ground work should be laid for extending the work. Without dissenting voice and with the offer of continued support the cooperators asked the committee to plan to continue the program that will restore America's nut trees and, in the words of Thomas P. Littlepage, president of the District of Columbia Chamber of Commerce, will "give young minds something bigger than material ambitions." Mr. Littlepage said that present conditions in the country indicate the need of worthwhile programs for leisure time and that young America needs to learn more of its country's history and have the opportunity of participating in outdoor activities which teach the joy of simple living.

J. J. McEntee of the office of Emergency Conservation Work; Linn C. Drake and Walter MacPeck, Washington Scout Executive and Director of Education, B. S. A.; Mrs. Thalia Wood of the General Federation of Women's Clubs, and Mrs. Carl Brown, representing the D. A. R., congratulated the committee on the progress of the program and urged them to carry it forward.

A letter from Robert H. Reed, associate editor of *The Country Gentleman*, contained the following message: "It is such a wholesome and worthwhile project that we sincerely hope that it will be carried on."

A meeting was held earlier in the day by members of the committee. C. A. Reed, associate pomologist, represented the Department of Agriculture; O. H. Benson, National Director of Rural Scouting, Boy Scouts of America; Burdett Green, secretary-manager, the American Walnut Manufacturers' Association; and Ovid Butler, executive secretary, and G. H. Collingwood, forester, The American Forestry Association. At that time the fall program of the National Nut Tree Planting Committee was outlined. It includes: The establishment of Historical Groves in state parks, Boy Scout camps, city and community parks, The creation of state and local committees to cooperate in the national nut tree planting program. The establishment of local nurseries for the planting of nut seeds from historic grounds. Nutting Day Pilgrimages for the collection of nut seeds and the distribution locally of the seeds which collectors gather in order that fall planting may be effected—a portion of the seeds to be sent to Washington for planting in the official nursery for seeds from historic grounds.

The committee authorized the awarding of the nut tree planting medal for unusual service to each person who: 1. Gathers and secures the planting of one bushel of nut seeds. He need not plant all the seeds himself, but he must send a record of their planting to the committee, stating by whom, when, and where. 2. Plants one bushel of nut seeds. 3. Plants twenty-five nut trees. 4. Is responsible for the establishment of an Historical Grove. All of the work must be done according to instruction and a record, countersigned by parents, Scoutmaster, club leader or a responsible adult, be sent to the committee. The committee will consider any outstanding service in nut tree planting and award medals when merited.

Ask the Forester?

Forestry Questions Submitted to The American Forestry Association, 1727 K St., N. W., Washington, D. C., Will be Answered in this Column. A Self-Addressed Stamped Envelope Accompanying Your Letter will Assure a Reply.

QUESTION: I wish to make an open fire place for a small room and do not know the proper ratio of the flue to the opening into the room.—B. G., Pennsylvania.

ANSWER: According to the United States Department of Agriculture Farmers' Bulletin No. 1230, a fireplace 30" high and 40" wide (or less if your room will permit) should have a flue opening 8"x16". This will permit lining the flue with special lining material or fire brick. There should be no contraction in size either at the throat or at the top of the chimney. The depth of the fireplace may be 12" to 18" and the chimney should extend at least two feet above the ridge of a peak roof or three feet above a flat roof.

QUESTION: Please give the wording of the pledge to preserve wild flowers.—G. A. H., New Jersey.

ANSWER: The following pledge was prepared in cooperation with several conservation groups and is distributed by the Wild Flower Preservation Society of Washington, D. C.: "That the world may be more beautiful for all to enjoy: I promise not to pick or destroy our native wild flowers, ferns and evergreens in the woods and fields unless abundant or weedy. I will use my influence to discourage the sale and purchase of rare and disappearing wild plants; to encourage the use of cultivated and artificial substitutes for Christmas and the establishment of Wild Flower Sanctuaries."

QUESTION: Some people around our office think "aspen mass," the lovely illustration in AMERICAN FORESTS for May, 1933, represents beech trees. Will you please check up on this?—E. C., New York.

ANSWER: This illustration is clearly a picture of aspen, sometimes called popple, technically named *Populus tremuloides*.

QUESTION: Is it correct to state that Colonial cabinet and chairmakers obtained curly maple from the common red maple? Did the rock or sugar maple furnish this lumber, as well as the birds' eye maple? Does splitting the plank produce the birds' eye, and quartering turn out the curly?—W. M. H., Jr., Pennsylvania.

ANSWER: Nearly all maple furniture made during Colonial times, as well as during present times, is cut from the hard or sugar maple. This is sometimes called rock maple.

Nearly all maple trees are relatively straight grained. The birds' eye or curly figure is fairly unusual, and its cause difficult to explain. Neither splitting nor quartering will produce the birds' eye or curly effect in wood which is not already curly. The figured grain

is established during the growth of the tree and remains with it always.

Red maple is softer, less durable, and usually less attractive. It may also develop a figured grain but because of the character of the wood is not so satisfactory.

QUESTION: The writer has just returned from a trip up into Maine and became involved in a number of discussions as to how much timber is still standing in the United States as compared to say 100 years ago—how much has been cut out by the people compared to that replaced by nature and the losses by fires, etc. What reference is there that I can secure the facts and figures on a subject of this kind?—W. A. K., Ohio.

ANSWER: The best source of information is Senate Document No. 12 of the 73d Congress, entitled "A National Plan for American Forestry," known as "The Copeland Report," published in two volumes with over 1600 pages.

The question is partially answered by the following quotation from page 174 of the Report:

"The present estimate of saw timber on commercial forest land in the United States is 1,668 billion board feet (board foot estimates based on lumber tally). Of this, 1,346 billion board feet, or 80 per cent, is old growth and represents the remainder of the original stands that have been crudely estimated as at least 5,200 billion board feet. The original forest growth on possibly 150 million acres was destroyed in clearing the land for agriculture in the early days. The volume of old growth cut for lumber since those early days has been estimated at 1,650 billion board feet. Cuttings for other purposes and continuous losses through fire, disease, and insects have taken the rest."

QUESTION: Please tell how heavy snowfall in the mountains is measured.—W. E. B., Pennsylvania.

ANSWER: The Weather Bureau reports that mountain snowfall is measured with a "sampling tube," which is open at both ends, and with a scale graduated in tenths of inches on the outside. The tube is forced through the snow layer to the ground, and the depth of the snow read on the scale. When the scale is withdrawn the snow in it is weighed on a spring balance. The graduation of some tubes is arranged to be read, for snow alone, in inches, and tenths, of water, so as to enable a direct comparison between the snow's depth and its water content. Other devices include graduated stakes set permanently, and reservoirs or gages into which the snow falls and is measured periodically, or at times only once a year.

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Send sample of fabric _____


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Source of Dutch Elm Disease Found

The Dutch elm disease has been found in elm burl logs imported from Europe for the cutting of fancy veneers, thus revealing to Department of Agriculture scientists at least one source of the plague which is threatening the most prized of American shade trees.

Immediately following this discovery Secretary of Agriculture Henry A. Wallace put machinery in motion to place under quarantine host materials likely to carry this disease from abroad. At a recent hearing it was proposed to permit logs to come into this country only after they have been treated at the port of entry. The Secretary will make a ruling on this proposal early in the fall.

R. Kent Beattie, of the Bureau of Plant Industry, who has been in charge of the Department's activities against the disease, revealed that L. M. Scott, plant quarantine inspector at Baltimore, had discovered living European elm bark beetles in ten elm burl logs which arrived at Baltimore en route to Kentucky. In Europe these beetles are known to carry on their bodies the fungus that causes this disease. Forest pathologists of the Bureau of Plant Industry discovered fungus growth in the logs and a laboratory culture of the material revealed the Dutch elm disease fungus.

In the New York and New Jersey area where the disease is known to exist trained federal and state workers are making an intensive drive to inspect elm trees and to procure test material from every elm which shows symptoms of the disease. There are other unimportant diseases of elms which are somewhat similar to the Dutch elm disease and, to avoid unnecessary destruction, a laboratory test is required to identify the fatal fungus. Civilian Conservation Corps workers are also busy assisting in the felling and burning of elms found to be infested.

Mr. Beattie outlined the course that will be followed in regard to recent importations of elm burls. Every importation of elm logs in the last ten years will be traced from the port of entry to its destination. Scouts will parallel the railway lines and cover all the area to which beetles might fly if they escaped en route. Scouts are already searching areas en-

circling the final destination of the logs which have been traced. Federal scientists regard it as probable that the New York and New Jersey infestations may have started from beetles that flew away from logs before or while they were being unloaded in New York Harbor or while they were in transit through the district.

Mr. Beattie said that three shipments of burl elm logs have been intercepted at Norfolk and two shipments in New York. Two of the Norfolk entries and one of the New York entries were proven to be infected with the Dutch elm disease fungus. With the consent of the importers, the federal authorities attempted to make these safe for entry. However, this does not remove the danger to elms near the ports, because several days often elapse between the time a ship arrives and the time when the logs can be unloaded and inspected. Meantime, one or many beetles may escape, fly to nearby elm trees, and start a new center of infestation from which the disease may spread to other trees.

The symptoms of the disease are a wilting of the leaves, or yellowing or browning of the leaves accompanied by brown streaks in the young wood. New York City, Baltimore, and Norfolk are the ports where elm burls have been imported in recent months and where, consequently, there is danger that the disease may possibly have become established.

In New Jersey 361 elm trees infected with the disease have been identified and destroyed. In New York thirteen cases have been identified.

European burl elm, sometimes called Carpathian elm, has come into favor in recent years in the American trade. It is a source of fine veneer, which when cut resembles curly maple. This is the purpose of the recent importation which provided the clue for the discovery of the method of entry which Mr. Beattie announced. The quantity imported has been relatively small, however, and the federal workers hope that prompt and vigilant tracing of all recent shipments will make it possible to exterminate every infected tree.

Association Urges Study of C. C. C. Project

The American Forestry Association has urged upon President Roosevelt that he designate an appropriate agency to make a study of the Civilian Conservation Corps with the idea of determining its usefulness as a permanent instrument of Government in advancing social and economic welfare. The National Planning Board of the Public Works Administration is suggested as a suitable agency to make the study.

At its meeting in the White Mountains in early September the Association members passed a resolution commending the project as it thus far has been conducted and urging that "the undertaking be studied with the view to its further continuance insofar as conditions may warrant." In transmitting the resolution to the President, Ovid Butler, Secretary of the Association, wrote:

"Your recent action in extending the services of the Corps for another six months has met with countrywide approval. The high social purpose which actuated your plan in the first instance naturally cannot be attained within the fleeting period of an emergency measure, and consideration of a permanent plan and future usefulness of the project, therefore, seems timely to us.

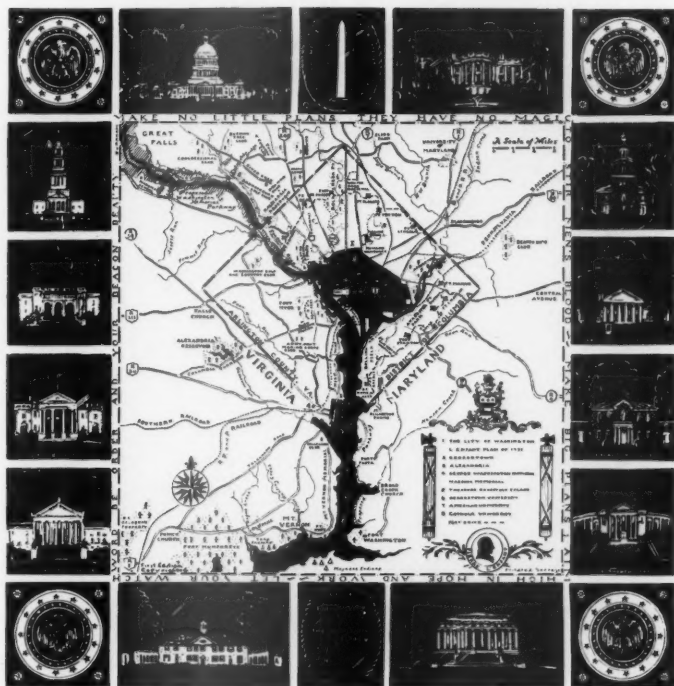
"The social handicaps suffered by a dis-

concerting percentage of our youth are not to be overcome with normal economic recovery. Due to the advance in machine process, it seems generally accepted that several million matured workers cannot be absorbed into industry as now constituted and that upon this surplus mass must fall for some time at least the annual impact of fresh accretions from the ranks of young men seeking employment.

"It is estimated that approximately one million young men at the critical age of eighteen discontinue their schooling and enter into competition on the labor market. Under conditions now faced by our country this competition cannot be wholesome, and it is this discouraging outlook for many young men that lends peculiar seriousness at this time to the need of continuing the Civilian Conservation Corps in some form or another for a protracted period if not as a permanent instrument in promoting social and economic welfare.

"To this end, may we suggest that some agency, such as the National Planning Board of the Public Works Administration, undertake a careful economic and social study of the project plan in cooperation with the Army, the Forest Service, and the Federal Relief Administration, so that if the findings warrant timely legislative action may be taken."

HANDKERCHIEF MAPS OF THE CAPITAL CITY



A "handkerchief map" of the City of Washington is helping finance the George Washington Memorial Parkway Fund. Created by Frederic A. Delano, chairman of the National Capital Park and Planning Commission, and president of the American Civic Association, the historical novelty, which is offered the public for sale, is printed on durable muslin and comes in red, blue, green, plum and terra cotta. It is twenty-eight inches square.

The plan for the sale of these handkerchief maps is being fostered by the American Civic Association and the National Park and Planning Commission to raise money for the George Washington Memorial Parkway Fund, incorporated solely to carry out the purposes of the acts of Congress in connection with the development of parks along the Potomac River between Great Falls and Mount Vernon. The recent opening of the parkway between Mount Vernon and Washington completes only about one-fourth of the whole project, and it is hoped to extend the road on the Virginia shore to Great Falls, where two locks built by George Washington may still be seen. It became necessary for Congress to curtail appropriations for the continuation of this work, and it is the plan of the American Civic Association

to raise additional funds by selling these "handkerchiefs" to Washington's yearly influx of tourists.

Mr. Delano found his inspiration for this ingenious idea in a rare cloth map of the Capital City which was printed about 1792 and had a second edition in 1796. Only a few of these early maps are known to be in existence today. The Library of Congress has three and the Metropolitan Museum of New York has one. Several are also known to be in the possession of private historical collections. The historical background of these early maps is vague but it is thought that they were brought out in connection with the auction sale of lots in the new "Federal Town" designed by L'Enfant.

The design for this new handkerchief map, which has been copyrighted by the American Civic Association, was drawn by Mildred G. Burrage of Kennebunkport, Maine. It reproduces not only the original L'Enfant Plan but a map of the surrounding country and its important landmarks, bordered by sketches of the notable buildings of the Nation's Capital. These maps may be ordered from the American Civic Association, 910 Union Trust Building, Washington, D. C., at one dollar each.

To Continue Jackson Hole Hearings

Further hearings by the United States Senate Committee investigating the famous Jackson Hole area in Wyoming will be conducted in the East, undoubtedly Washington, early this winter, it has been announced. The date has not been set. The Committee is expected to recommend whether the picturesque area will be made an extension of the Yellowstone National Park or whether it will remain in private holdings. John D. Rockefeller, Jr., has purchased for \$1,000,000 the 40,000 acres of deeded land in the Jackson Hole area and has offered to give it to the Federal Government

if the remaining public lands exceeding 200,000 acres are joined with it and dedicated as a primitive wilderness area.

At the first hearings held in August at Jackson Hole there was abundant testimony that the price paid by Rockefeller, through the Snake River Land Company, was very liberal, and that most of the owners who sold their land were anxious to sell. The opposition based its arguments chiefly on the loss of taxes to Wyoming should this area pass into the hands of the Federal Government.

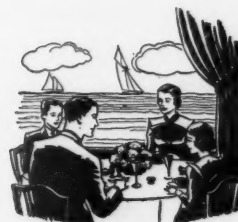
Senator Gerald P. Nye, of North Dakota, headed the investigating committee.

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Which shall it be?

**Thanks-getting
dinner at home,
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Dinner**

BY THE SEA?



AT HOME there will be work and worry—a turkey to select and stuff and roast, vegetables to prepare, cakes and pies to make, flowers to buy and arrange, the table to set, glass, china and silver to wash afterward—the maid to mollify.

At Chalfonte-Haddon Hall it will be just fun—your own table. Your own individual turkey with a variety of good things to go with it to suit every taste. When you're full to bursting, how you will welcome a brisk hike on the Boardwalk with the tang of the ocean in your nostrils!

Come down Wednesday afternoon and make a delightful week-end of it. (Rates are modest.) The ocean breeze is crisp but mild, the sunshine mellow. Lots to do, in the hotel and out-of-doors. . . . A snooze in the sun on our broad Ocean Decks. Squash. Diverting game rooms. Entertainments. Invigorating rest. Chalfonte-Haddon Hall makes a perfect holiday-home for young and old. American and European plans.

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Planting Irons, Fire Rakes, Swatters, Brush Hooks, Hoes, Bark Blazers, Thinning Axes and Special Tools for Land Owners, Timber Growers, Turpentine Operators, etc.

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Each card is an alluring piece of native wood no thicker than the usual card. Made to order with your name and choice of wood, decoration and greeting.

The price—\$5.00 for 25, \$16.00 for 100—includes correspondence cards and envelopes.

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Smaller cards, less elaborate decorations, Pine and Maple only, assortment of 10 for \$1.00.

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John Rich & Bros., Woolrich, Pa.
Kindly send your catalog immediately.

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\$600,000 for Clarke-McNary Cooperation

Cooperative forest fire protection in most of the states will be accelerated if approval is given a request for \$600,000 from the National Recovery Administration with which to replace a similar amount deducted from the Clarke-McNary fund under the Economy Act. This proposal is the result of requests from many of the states, in which The American Forestry Association joined. Under date of September 21, this Association directed a letter to Secretary Ickes, in charge of the Public Works Program, calling his attention to the fact that, with millions of dollars now being spent under the Emergency Conservation Project, the Public Works Program, and other government projects for the reclamation and development of forest and land resources, hazardous gaps in the nation-wide defense against forest destruction by fire are being created. All of the special work in forest development involves investments of capital whose ultimate returns demand adequate protection from depletion as well as from complete destruction by fire.

Should the \$600,000 be granted by the National Recovery Administration it will be distributed among the several states in accordance with the plans in practice under the Clarke-McNary Act and will make their Federal receipts for cooperative fire protection comparable with those of 1932. Even this will not permit the states to expend as much money on fire protection as during 1931 because state and private contributions for this purpose have declined in the face of economy. The 1931 expenditure from state and private sources was \$5,688,000. Expenditures from the same sources in 1932 dropped to \$3,999,000. The added allotment from the Public Works funds will permit the reemployment of many trained men throughout the country and will strengthen the skeleton organization for forest fire fighting which exists in every forested state.

The allotment of public works funds may be handled under the Clarke-McNary organization in the Forest Service and would range from \$500 to Hawaii, and \$1,000 to Rhode Island, up to approximately \$112,000 to the State of California.

Bennett Heads New Soil Bureau

H. H. Bennett, formerly with the Bureau of Chemistry and Soils of the Department of Agriculture, has been named chief of a new bureau devoted to control of soil erosion in the Department of Interior.

The new unit, to be known as the Division of Erosion, will operate with a fund of \$5,000,000 allotted by the Public Works Administration. In addition to studying erosion, it will lend its efforts to bettering flood conditions.

Mr. Bennett, active in the soil survey in this country of the Department of Agriculture, has made surveys in Alaska, Panama, South America and Cuba.

North Carolina Forestry Association Reorganizes

James G. K. McClure, Jr., Asheville, North Carolina is the newly elected President of the North Carolina Forestry Association. He was elected at a reorganization meeting of the Association held at Raleigh on September 8. Other newly elected officers are: Treasurer, Reuben B. Robertson, Jr., Canton; secretary, R. W. Graeber, State College, Raleigh; vice-presidents, Lawrence Sprunt, Wilmington; Mrs. John H. Anderson, Raleigh; A. O. Weidlich, Sylva. Colonel Joseph Hyde Pratt of Chapel Hill was reelected Chairman of the Executive Committee.

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A collection of actual wood sections (showing end, quarter and flat grains of each species), with text, telling uses, properties, distribution, etc. The plates in which the thin sections are mounted are removable for examination.

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Forest Tree Seedlings For America's Reforestation Program

Bargains in black or yellow locust, black walnut, butternut, tulip, Russian Mulberry and others. Large or small quantities. Write TODAY for price list.

BOYD NURSERY CO.
McMinnville, Tennessee

OREGON'S FOREST FIRE TRAGEDY

(Continued from page 490)

lighted fantastically by the flames, resembled a gigantic volcano bursting forth in all its fury. Gradually as night wore on, a fog—the first one in days—drifted in from the coast. By morning the fire was again on the ground, but the 40,000 acres of August 24 had grown to a total of 311,000 acres—just twenty hours later.

One of the marvels of the fire was the fact that only one man was killed. This was Frank Palmer, a C. C. C. boy from Illinois. He was patrolling the fire line one night when he and another youngster sat down to rest. Without warning a tree fell and struck him across the chest. He was killed instantly. His companion sustained severe injuries to his legs. Strangely enough, the tree that killed young Palmer was a green Douglas fir that in some unexplained manner had never been touched by the fire.

The old Trask House, a landmark in western Oregon, was totally destroyed. This was the old toll station when the Trask River road was the only means of travel from the Willamette Valley to the coast. As men who were scouting the fire approached the site of the old house, a lonely, yellow tabby cat came out to greet them. In their haste to get away from the flames, the family living there had forgotten their pet and her kittens. The kittens had evidently perished in the flames that claimed the famous resort. How the mother cat survived that terrible heat will never be known. She was carried out to her owners when the scouts returned to Tillamook.

The loss of animal life must have been appalling. Charred bodies of many deer were found and in almost every instance they were lying with their heads toward the west. One

large buck was evidently overtaken as he was fleeing along an open road. Another deer was found impaled upon a large spruce limb. Evidently blinded by the smoke, it had leaped with terrific force against the protruding branch. A yearling lay crushed beneath a fallen snag. One large buck made its way to the Smith place, the only unburned spot in miles, and remained there. A small dog chased

it into the river and the caretaker of the place ran to the deer's aid. The deer had lost all fear of the man and seemed to regard him as a friend, for it made frantic efforts to keep the caretaker between itself and the dog. Finally the dog succeeded in grasping the deer by the flank and the animal ran directly up to the caretaker. He grasped the deer by the horn and with the other hand choked the dog loose. The deer remains there and the dog is tied up.

The Tillamook fire has become history, but its effects upon the welfare of the citizens of Oregon will be felt for many years. Fourteen and one-half billion board feet of timber were within the exterior boundaries of the fire. Over ten billion feet have been killed. Based upon pre-depression prices, the owners face a possible loss of \$20,000,000. But the manufactured products placed upon cars would have brought upward of \$200,000,000 into the State. The only hope lies in salvage, but the enormous amount of timber involved makes it impossible to log it all before decay and insects take a large toll. Isolation and expense of development under present conditions place an impossible barrier before the private interests. It is a stupendous problem and necessitates concerted private and public action to remove all possible values.

THE FOREST FIRE

By Mary Greene Whipple

Grand monarchs of the centuries
Survivors of the past,
Inured to flood and storm and drought,
Your conqueror comes at last.

It flies in leaping, hungry tongues
From flaming, belching jaw
And licks your plumes of waving green
To feed its ravaging maw.

In nameless, shivering terror flee
The wild things of the wood,
Then turning, frenzied, in their flight,
They perish in the flood.

It leaps, it twists in fiendish glee,
Flings laughing to the sky
Its scorching, bloody paws of flame
And grasps the birds that fly;

And raging with a horrid roar,
It rushes on, and flies,
With crash of limbs and rolling smoke,
Across the darkened skies.

Grand monarchs of the centuries.
Survivors of the past,
Inured to flood and storm and drought,
Your conqueror comes at last.

Gaunt, naked skeletons you stand
Against a brazen sky,
While round your feet your verdant greens
In paling ashes lie.

MONARCH OF THE PRAIRIES

(Continued from page 493)

grows so rapidly that regular thinning is necessary. Just over a year ago a successful aerial census of the animals was taken, and proved how numerous they are getting.

Early in the winter of 1931-32 about 1,500 animals were slaughtered, and twenty-four carloads of buffalo meat were sent to Montreal, Toronto, Winnipeg, Regina, Prince Albert, Edmonton and Vancouver for hotels and restaurants. On March 31, 1932, there were 6,315 buffaloes in Buffalo National Park. Reduction of numbers is essential owing to the increase of the herds, but this judicious thinning is far different to the massacres

of last century, when the animals were wiped out for their hides which fetched two dollars each.

The buffaloes thinned out are of high commercial value. The flesh is so excellent that it is quickly disposed of both in Canada and the United States. The buffalo robes and coats of today are of far better quality than those of the last century, when most of the animals were shot by the Indians in summer, at the time when the fur was at its poorest. Now the beasts are killed when the robe has attained its winter thickness, and the charming dark color which distinguishes it in the cold season.

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COVER AMERICA'S LOST DOMAIN

Bare, burned over acres can be brought back. Hillsides and valleys can be made green, and profitable. Plant the vacant, bare fields with

Black Locust
Red or Black Pines
Norway or White Spruces

Prices have not yet been increased. A little money invested now begins at once to grow into dividends. Write for our Autumn price list of trees for forest planting and lining out.

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FOREST AND NURSERY

HERBST BROTHERS, INC.

TREE AND SHRUB SEED SPECIALISTS
92 Warren Street, New York, N. Y.

EVERGREEN TREES

FOR FOREST PLANTING

CERTIFIED White Pine, free from blister rust, Norway and White Spruce, Scotch and Red Pine and other varieties. Know our reasonable prices. Get our figures on Contract Planting.

Western Maine Forest Nursery
Dept. A-103, Fryeburg, Maine

FRANKLIN FORESTRY CO.

Nurseries at

Sudbury, Shelburne Falls and Colrain, Mass.
EVERGREENS AND PERENNIALS
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GUESSING TIMBER COSTS MONEY

Measure the Amount of Timber on Your Southern Pine Woodland or Forest with Our Specially Designed

LOG-SCALE STICK and TREE-SCALE STICK

With These Sticks

—You can quickly and accurately tell how much lumber in board feet your logs of any kind will saw out by careful saw-milling (the International Log Rule), also what they scale by the Doyle Rule.

—You can quickly and accurately tell how many 16-foot log cuts there are in standing trees.

—You can quickly and accurately estimate the contents in board feet (by the Doyle Rule or the more accurate International Rule) of standing trees of the Shortleaf, Longleaf, Slash or Loblolly Pines.

Each set consists of the two Timber Scale Sticks in a canvas container with a 16-page booklet giving complete instructions for use and other helpful information.

Know your timber as you do your field crops and livestock!

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Order direct from the Distributors

THE AMERICAN
FORESTRY ASSOCIATION

1713 K St., N. W. Washington, D. C.

TOOLS For America's Emergency Conservation Program

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Page 520

Tree Pruners, Pole Saws and Cross
Cut Saws. Write for catalog.

COUNCIL TOOL CO.
Page 522

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Page 517

PLUMB, INC., FAYETTE R.
Page 515

The famous PLUMB AXE.

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Forester Pruning Tool No. 3. Write
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Page 518
Indian Fire Pumps

VICTOR COMPANY, THE
Page 516
One-Hand Bush Hook

WARREN TOOL CORP.
Page 513
Forestry Tools of Every Description

THE GREAT LIGNIN MYSTERY

(Continued from page 496)

centrated to form a "lye" containing fifty-two per cent of solid matter, or else it was dried to a powder. To lay the dust, the diluted lye is sprinkled directly over the road, and this surfacing may or may not be followed by the judicious application of either milk of lime or calcium chloride. The powdered lignosulfonate may be spread on the road after a rainfall. The fact that in 1928, over 130,000 kilos of powdered lignosulfonate and 2,000,000 kilos of the lye were used for road improvement in Sweden brings assurance that fewer fish are being poisoned in Scandinavia. Taking a leaf out of the Swedish notebook, the New Jersey Highway Department has used a concentrated waste liquor on the roads of that state with some success during the past few years.

Other uses of waste sulfite can only be touched upon. In fastening linoleum, an excellent cement is now used, in which clay and a preservative are incorporated into the waste liquor. For many years chemists have known that a subtle relationship exists between lignin and the natural tannins. In 1931 nearly 4,000,000 pounds of waste liquor and 280,000 pounds of dry lignosulfonate were used in tanning sole leather in the United States.

Realizing the probable kinship between soil humus and lignin, abortive attempts have been made to use the sulfite waste as a fertilizer, with rather indefinite results. On the other hand the spent liquors have been used successfully in agricultural sprays for combating fungal and insect attacks. Lime and sulfur are already present, and when the malodorous hydrogen sulfide gas is passed into the mixture, a first class imitation of a "lime-sulfur" spray is obtained. The lignin in the mixture plays the role of emulsifying agent. Thus the active combatants, lime and sulfur, are kept in a very fine state of suspension, and can reach the maximum area of leaf and stem with the minimum waste and expenditure.

Some of the "queer" uses suggested for waste sulfite liquor include: its application as a remedy for pulmonary diseases, with a clinic actually opened in Austria forty years ago for the treatment of some sufferers; the preservation of eggs, the prevention of "hoof and mouth disease," the manufacture of explosives, and the "deinking" of old paper. So far no one has suggested it as a cure for the depression. Needless to say, none of these brilliant ideas have solved the problem of lignin utilization.

The use of lignosulfonate which still merits immediate attention to-day is that of fuel. Daily wastes from the average fifty-ton pulp mill have a heating value roughly equivalent to that of thirty-three tons of bituminous coal. If this liquor were "desulfurized" and dried by the most efficient methods, the lignin materials would probably furnish enough steam to operate all the pulp digesters of the plant.

What of the lignin in purely agricultural wastes, like straws, corn cobs, and oat hulls? Their study is being vigorously pushed by Dr. Max Phillips and his associates in the Bureau of Chemistry and Soils. Certain cereal plants have the bad habit of refusing to stand up straight when they are nearly full grown. "Lying down on the job" in this way is termed *lodging*. For 135 years agriculturists have debated the cause of this lodging, which frequently brings losses of ten bushels an acre. It has been ascribed, and justly so, to lack of silica and also to the application of too much nitrate of soda fertilizer. Mr. Phillips and his collaborators have shown that if this fertilizer is omitted, the plants contain normal amounts of lignin and stand erect. If, however, it is vigorously applied during the early part of growth, too much lignin is formed and lodging occurs. Until quite recently, it has been generally supposed that lignin functioned largely in fortifying and in lending strength to the plant stem. However, as Drs. Hawley and Dadsell of the United States Forest Products Laboratory had already shown in the case of wood, this is not strictly true. An excess of lignin may make wood brash and brittle. It may also lower the resistance of a cereal plant.

Much of the work on lignin at the Bureau of Chemistry is still young, but it has interesting industrial implications. For example, when distilled with zinc in hydrogen, lignin furnishes certain very interesting chemicals, among them *guaiacol*, which has been used in medicine, and its near relative, *catechol*, a photographic developer. Direct distillation of lignin gives *eugenol*, important component of cloves and cinnamon. In another type of distillation, corn cob lignin gave large amounts of an oily distillate, which was carefully separated into eleven components—among them the valued disinfectants *phenol* and *cresol*. A different set of chemical explorations suggest the possible use of lignin in the preparation of "synthetic resins" by its combination with aniline and its coal-tar kinsmen. The use of these artificial products in making varnishes and as binders in the formation of artificial boards may still come to pass, although at present they do not quite measure up to some other synthetic resins.

The investigations at Washington are among the most thorough that have ever been instituted in surveying the chemical possibilities of the lignin of agricultural wastes. They approach far more closely than heretofore the studies made on coal tar.

It seems then that new floodlights are being turned on the lignin mystery, and, that although the lignin molecule still remains shrouded with its economic utilization as yet largely unsolved, progress is accelerating rapidly, and in the right direction. When another commercial bonanza is opened up, when lignin takes its rightful place in industry, due credit should be given to the pioneering spirit of old Anselme Payen, professor at the *Arts et Metiers*, in the gloomy old rue St. Denis.

THE CIVILIAN CONSERVATION CORPS CARRIES ON!

(Continued from page 509)

She was to continue working. He would go on as a C. C. C., changing his allotment to her. He planned to stay in the camp during the week, coming in when a ride presented itself, and over the week-ends, they could be together, couldn't they?

"And it won't be long until I can get a job in town, and then we'll be all set," he said. He hesitated over the next question. "Go

back to the city? Me? Nuts! I'm all set right here for the rest of my life."

"Can we get along?" she repeated. "Of course we can. Why, there's many a family livin' on less up here. You can believe me we'll do all right." There was a determined set to her lips. Most everyone believes they will. Many others are destined to settle in the far ranges, their fate guided by a President's dream.

When Writing Advertisers—Mention AMERICAN FORESTS

Organize National Wood Fibre Growers' Association

Plans for establishing a pulp and paper plant to use wood from Georgia and Florida were started when the National Wood Fiber Growers' Association was organized in Fernandina, Florida, on September 12. President J. H. Allen outlined plans under which a plant having a daily production capacity of 400 tons of wood pulp and capable of giving extensive local employment, would be partially financed through Public Works funds. The pulp wood necessary for operating the plant will be purchased from timber owners in Southern Georgia and Northern Florida, including the Ocala and the Ocoee National Forests.

Other officers elected at the organization meeting include William L. Wilson, of Jacksonville, general vice-president, together with R. M. Morris, Illinois; S. A. Allen, Arkansas; F. L. Finkenstead, North Carolina; E. H. Mayo, Alabama; Paul T. Sanderson, Texas; and R. E. Benedict, Georgia, to serve as vice-presidents for their several states. J. L. Allen is counsel for the Association.

Tennessee's First Warden Dead

The recent death of Nat T. Wills, of Johnson County, marked the passing of Tennessee's first forest warden. Mr. Wills was appointed in September 1921 to this office by Assistant State Forester Gordon D. Marckworth.

Mr. Wills served in the capacity of forest warden from the time of his appointment twelve years ago until his death. He was seventy-three years old and had done outstanding work in Johnson County, where he left an enviable record. He had the distinction of being a great bear hunter and of having killed about thirty-five years ago the largest bear that ever roamed the mountains of Johnson County.

New Wooden Connectors In Florida Fire Tower

A wooden lookout tower, using the "Alligator" wooden joint connectors, is now being constructed for the Florida Forest Service. The tower is located near Dinsmore, Duval County, and will overlook the northern part of that county and the southern part of Nassau County.

The completed tower is to be eighty feet in height and is being constructed at a cost of \$1,395. W. Kenyon Drake, of Jacksonville, is the architect. Built as an experiment and to encourage the use of wood, this tower will serve also as an indicator of costs, tools required, construction problems and time necessary for completion.

Selfridge Succeeds Stark as Lumber Industry Adviser to NRA

M. W. Stark, of Columbus, Ohio, has resigned as lumber industry adviser to Thomas Glasgow, deputy NRA administrator, and E. A. Selfridge has been appointed to succeed him. Mr. Stark has accepted the position of executive director of the National Millwork Association, which constitutes a division under the Lumber Code. Mr. Stark's offices will be in Chicago.

Mr. Selfridge is well known in the lumber industry and in the government. He was for many years a successful lumber manufacturer in the California redwood region. After retirement he became a lumber trade commissioner of the Department of Commerce, and he served some years in that capacity in the Far East and in Europe, having his headquarters respectively at Tokyo and London. He resigned four years ago.

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THE AMERICAN FORESTRY ASSOCIATION
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WASHINGTON, D. C.

193

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SAMUEL N. SPRING, Dean

WHY THE PLAINS ARE TREELESS

(Continued from page 485)

Under such conditions of evaporation and dessication, only plants adapted to dry regions can survive on the plains. Forest trees are perennial, and must be able to live through all varying conditions of the season. If any part of the season is fatal to mesophytic trees, or those suited to growth in conditions of medium moisture, that crucial period is sufficient to wipe out the forest growth, even though the rest of the season be climatically favorable.

"Moreover," says one geologist, "it should be remembered that trees are tall, and lift the transpiring leaf surfaces to a considerable height. In this position the leaves are not only more exposed to the direct rays of the sun, but they are much more exposed to strong winds." The leaf-area subject to evaporation, it might be added, is much greater in trees, proportionately, than in grasses, and, as a rule, tree leaves are less adapted to retain moisture than grasses.

Scores of hypotheses have been advanced to explain the treelessness of the plains, but the theory of exposure to evaporation is probably the most far-reaching, and more nearly fits all factors in the case. Trees grow along streams in the plains, and on hillsides with a slope not exposed to prevalent winds. This latter fact disposes of arguments that the amount of rainfall, the temperature, wind as a mechanical force, or the nature of the soil, enters more than incidentally into the explanation.

It has been said that over-grazing by buffaloes and their numerous and diverse grass-eating contemporaries and forerunners might have beaten back the edge of forest-growths, but more recent observations of planted and

protected prairie groves tend to minimize this theory to local significance. It has also been stated that fires, either set by Indians to provide additional grazing areas for bison herds, or accidentally caused by lightning, may have had some influence, but those who have studied the question acutely declare that prairie-fires were more an effect of favorable conditions for fires than a cause, preventing the spread of trees.

The reader should not confuse the more eastern treeless plains with the Great Plains which are treeless because of aridity. Wide expanses of prairie east of the Mississippi, and some even west of the river, were covered with trees at the time of the westward emigration. But early pioneers would not settle where there were no trees; they did not believe land that did not support trees was fertile, so they cleared land for their crops; nor did the treeless plains furnish building materials, fuel, and water; besides, they held the dread of prairie-fires, and of terrific blizzards in winter.

In the constricted scope of a short article we have considered the physical conditions that made forest-life impossible on the Great Plains; we have introduced that phase of American prehistory which traces the birth of the plains and their adjacent mountains; we have seen the zoological importance of the great grassy arena in the evolution of animal forms and instincts; and we can understand, perhaps with added clarity, how it happens that wheat, of close kin to the grasses, and which evolved on the plains of the other hemisphere instead of trees, should grow so luxuriantly on our own.

WHEN EAST GOES WEST

(Continued from page 501)

forest. Strangely enough some of the most contented groups of men are in remote situations. One camp is over 10,000 feet in elevation in Colorado and there is a frost or freeze nearly every night. Some are located in the dense white pine forests of northern Idaho and the beautiful fir, spruce and pine forests of the high Cascade Mountains in Washington and Oregon. The site of one of the mountain camps in southern Washington is at the head of a broad valley once beautifully forested. A devastating fire swept up this gulch and burned thousands of acres of valuable timber, leaving nothing but tall, stark spires of dead trees. These snags constitute a great menace for the new forest which springs up on these old burns. When afire they act as a flaming torch from which fire brands are scattered. One of the important jobs the C.C.C. boys are doing is to cut down these snags.

Nearly every camp possesses the "best" baseball and boxing team or orchestra. Some have developed dramatics; one has a very able preacher who serves the religious natures of the boys on Sundays.

An excellent spirit of friendliness, patience and tolerance has been exhibited by the Army and Forest Service officers in charge of these camps. Many of the boys had never seen or used an ax or cross-cut saw. Their muscles were soft and untrained. One company from New York City found about five feet of snow on arrival at their camp site. Undaunted, they cleared the ground and made the camp as habitable and as comfortable as possible. Within a few days the Camp Commander had sixty boys out on forest jobs. At another camp a swift tornado, blowing down a narrow moun-

tain canyon, swept the tents away. This happened in the early evening. The boys spent most of the night trying to find their clothing and equipment, as well as a place to sleep. They were amazed to find that the cook had gathered his materials together and served breakfast as usual, consisting of fruit, oatmeal, scrambled eggs, bacon, hot coffee—and plenty of it.

While the men are receiving a great education in western ways and in the life of the forest, they are making a real contribution to its betterment and development. But perhaps the greatest single benefit, after all is said and done, will come from the making of better citizenship. Many of these boys, untrained and unskilled for any particular job, are going out into the world with a new, healthier, and finer outlook on life. Both their moral courage and their muscles have been tested. They have developed a great respect for themselves as well as for the objectives of the nation's great forestry program.

A new social consciousness is sure to be evolved. The splendid way in which the Army officers and forestry men have developed a fine spirit and high type of morale has contributed in no small measure to this reawakening among American youth. It has been a new adventure. While the pioneer days have passed with the crossing of the last frontier, America is being rediscovered. Boys who would never have left the cities now appreciate the beauties and values to be found in the western part of the country. They are meeting the challenge with an excellent spirit. As long as this spirit is evident, the traditions and standards of the American commonwealth will endure.

RESTORATION OF RURAL LIFE

(Continued from page 486)

rural communities to those portions of the country where land abandonment has created wildernesses is a matter of finding a source of income sufficient to support a population dense enough to make it socially attractive. Agriculture on the poorer soils incapable of supporting such a population without supplemental aid is economically impossible and socially undesirable, but agriculture plus forestry will raise to an acceptable human standard the living of a considerable population occupying lands otherwise submarginal.

The employment opportunities provided by forestry and forest industries vary within a wide range according to the intensiveness of the silvicultural practice, the development of the stands and the character of the forest industries. An estimate of the probable amount of such employment should include side lines such as trapping, guiding, caring for recreational areas, as well as those directly employed in forest protection, planting, improvement construction and logging. In European countries, where many forests have been under sustained yield management for a long time and are managed rather intensively, it amounts to as much as one person for every twenty-five acres but an average figure is probably not more than one man for every 100 acres. For the United States it is possible that its forests when fully productive may give employment to one man for every 250 acres or the equivalent of full-time work for some two million persons.

This potential earning power when supplemented with agriculture offers a substantial contribution toward the solution of the marginal land problem. The share that forestry or agriculture shall have in the support of any community should be determined by scientific land use planning. The nation cannot afford to repeat the errors which have marked the policies of land economy in the past and which are directly responsible for the serious problem of land bankruptcy now confronting it.

Land use planning must not be confined to the rehabilitation of the devastated and abandoned lands. The national welfare demands that the best use shall be made of all land re-

sources. It is as much in the public welfare that wise planning shall direct the use of the highly productive agricultural areas and the management of virgin forests as it is important that wise planning shall govern the use of submarginal land. It approaches the principle of a public service interest in private land which shall direct the use of the property in a manner not inimical to the public welfare. The principle finds expression in public aid extended to private owners, for the control of erosion and of insect pests and diseases. It has recently found expression in the Lumber Industry Code under the National Industrial Recovery Act. Under Article X of the Code the "industries undertake, in cooperation with public and other agencies, to carry out such practicable measures as may be necessary for the declared purpose of the Code in respect of conservation and sustained production of forest resources." The adoption of this code has been hailed by lumbermen and foresters as one of the most significant steps that has ever been taken in the field of forest conservation.

It establishes sustained yield as a guiding principle of good management of commercial forest land. It is regarded as the most important development in forestry of recent years in that it opens the way toward some measure of regulation in the cutting of private forests. It strikes at the heart of the problem of forest depletion by destructive logging—a problem which has assumed a most serious aspect because of its effect upon the public welfare.

There are already 83,000,000 acres of devastated forest land. This area is being increased annually by 850,000 acres. Of 10,000,000 acres cut over each year ninety-eight per cent is privately owned and ninety-five per cent of the private cutting is made without any conscious regard to the future productive state of the forest, but nearly all of the cutting on the public forests is designed to perpetuate the forest. Obviously some new method of handling the remaining private timber must be devised. To continue destructive exploitation of the remaining private stands with all the attending ills of land abandonment would be in flagrant disregard of the public welfare.

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Advertisements from reputable individuals and concerns will be inserted under this head at the rate of 10c a word per insertion, cash with order. Display rates on application. No advertisement will be inserted for less than \$1.00. Abbreviations, initials and letters will be counted as words. Name and address must be given, as advertisements will not be inserted in this section with only a box number. Address all orders to Classified Advertising Department, AMERICAN FORESTS Magazine, 1713 K Street, N. W., Washington, D. C.

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When Writing Advertisers—Mention AMERICAN FORESTS

Index to ADVERTISERS

NOVEMBER, 1933

	PAGE
American Red Cross.....	522
American Tel. & Tel. Co.....	2nd Cover
Bartlett Manufacturing Co.....	520
Bass Camera Co., Inc.....	527
Boyd Nursery Co.....	522
Chalfonte-Haddon Hall.....	521
Council Tool Co., The.....	522
Fechheimer Bros. Co., The.....	520
Fiala, Anthony.....	527
Franklin Forestry Co.....	523
Happy Days Publishing Co.....	517
Herbst Brothers, Inc.....	523
Hough Company, Romeyn B.....	522
Idaho School of Forestry.....	526
Keene Forestry Associates.....	523
Kelsey Nursery Service, F. W.....	523
Lee Sales Company, O.....	520
Leitz, Inc., E.....	516
Lincoln Hotel.....	518
Long Bell Lumber Co., The.....	513
Madden, B. L.....	522
Maine School of Forestry.....	520
New York State College of Forestry.....	526
Palisade Press.....	527
Panama Pump Company.....	517
Plumb, Inc., Fayette R.....	515
Porter, Inc., H. K.....	519
Remington Arms Co., Inc.....	4th Cover
Schoepfer, G.....	527
Scribner's Sons, Charles.....	517
Smith, D. B. & Co.....	518
Tabor, Rollin H.....	527
Victor Company, The.....	516
Warren Tool Corporation.....	513
Western Cartridge Company.....	514
Western Maine Forest Nursery.....	523
Winship, Boit and Company.....	519
Wisconsin Aquatic Nurseries.....	527
Western Cartridge Company.....	513
Woolrich Woolen Mills.....	522

DON AND DONNA

(Continued from page 506)

This fact seemed to cause trouble in our quail family. Don II refused to share his partner's affections with grown-up sons, and he chastised them severely with his powerful beak whenever they ventured near her. They were then put in a separate cage where they were within sight and sound of their parents, but later they were transferred to the local zoo.

Wild birds in the garden saw, and apparently conversed, with Don and Donna. Catbirds, robins, grackles, and even wood thrushes, alighted near the bird house, or on it, examined it and its occupants curiously, and uttered sounds peculiar to their kind. One day a catbird alighted on the roof, held on to the edge with its claws and hung, head downward, in an effort to see the birds within. A young sparrow visited them many times, then found a hole under the door through which it was able to enter. Inside it made free with the grain and water provided, mounted a perch and preened itself contentedly. It even tried to induce another sparrow to join it in its new-found palace of delights. The sparrow on the outside tried in vain to squeeze its body through the wire mesh when the one on the inside flew close to it, then squatted on the ground with out-stretched wings near the hole under the door. These movements it repeated several times, but a mouse appeared in the hole at that moment and the second sparrow took wing.

The guest sparrow went and came at will, sometimes staying all day, and slept through the night on the topmost perch. Don and Donna did not seem to resent its presence. When the hole under the door was closed so that it could not enter we were surprised one day to find a fledgling sparrow in the house as a guest of our quail family. It came and went at will, just like its predecessor, until it was too large to squeeze through the wire mesh.

After observing the family life of Donna and the two Dons during several years, we believe ourselves justified in claiming for them an intelligence on a par with catbirds and robins, or even with our clever brown thrashers.

Poison Oak Held to be an Accidental Injury

The Oregon Supreme Court holds, in an opinion written by Chief Justice Rand, that poison oak comes under the head of an accidental injury, and a person suffering a disability therefrom is entitled to compensation from the State Industrial Accident Commission.

The case appealed to the Supreme Court is entitled C. O. Banister, respondent, vs. State Industrial Accident Commission, appellant. Banister was an employee of the City of Portland who was engaged in cutting brush and came in contact with poison oak in ignorance of what it was, and sustained the injury which resulted in his disability for a period of about nineteen days. The Industrial Accident Commission rejected the claim for compensation on the ground that it was not due to an accidental injury arising out of and in the course of his employment, but the lower court set aside the order of the Commission and awarded compensation.

This opinion is of considerable interest to employees of the various forestry organizations inasmuch as many of them have had their claims turned down by the Commission.

When Writing Advertisers—Mention AMERICAN FORESTS

WHO'S WHO

Among the Authors in This Issue



E. R. Yarham

E. R. YARHAM (*Monarch of the Prairies*) is a Fellow in the Royal Geographical Society (London) and a member of the British Empire Naturalists' Association. He has written articles on wild life conservation and the National Parks movement for publications in many parts of the

British Empire. His particular interests lie in the protection of birds and animals, in the preservation of woodlands.

DAREL MCCONKEY (*Why The Plains Are Treeless*) lives in Washington, D. C., where he is devoting his time to writing. His articles have frequently appeared in AMERICAN FORESTS. Mr. McConkey was formerly assistant extension editor for the West Virginia Agricultural Extension Service.

LOUIS ELSBERG WISE (*The Great Lignin Mystery*) is a distinguished chemist who has specialized in the chemistry of wood products. Now professor emeritus, Dr. Wise was for many years professor of the chemistry of wood products at the New York State College of Forestry at Syracuse.

ELIZABETH E. MORSE (*Its Ancient Enemy Discovered*) is Secretary of the Mycological Society at Berkeley, California. She is at present selecting specimens for the herbarium of the University of California and for the National Museum at Washington, D. C.

ELLEN TORELLE NAGLER (*Don and Donna—A True Story*) is a teacher, author, lecturer and educational reformer who lives at Madison, Wisconsin.

NELSON C. BROWN (*When East Goes West*) is in charge of forest utilization at the New York State College of Forestry, at Syracuse, and at the present time is the official inspector of the work of the Emergency Conservation Corps.

LYNN F. CRONEMILLER (*Oregon's Forest Fire Tragedy*) is State Forester for Oregon, with headquarters at Salem.

FREEMAN C. BISHOP (*The Civilian Conservation Corps Carries On!*) is a newspaper man by profession but for some time has been enlisted in a Conservation Camp.

FRANK A. WAUGH (*"Sacred" Deer*) was born in Wisconsin, worked on a newspaper, and is now a professor at the Massachusetts Agricultural College, at Amherst.



Elizabeth E. Morse

